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RAILWAY AGE

The Basic Error in the Government's Transport Policy

It is a characteristic failure on the part of the various departments of the federal government which deal with transportation that they usually do not recognize that the interest of the people of the United States in "adequate and efficient transportation" is something apart and different from the immediate and selfish interests of specific groups of shippers. That is to say, the construction of the Beaver-Mahoning canal might serve the immediate and selfish interests of certain shippers in the region between Pittsburgh and Lake Erie, without at the same time serving the long-term interests of the American people as a whole. But the Army Engineers did not recognize any distinction between such local interests and that of the people as a whole.

Similarly, the Bureau of Public Roads has lent its support to theories of highway construction and finance which have been cited to "justify" lower levies for commercial use of the roads than other (and probably sounder) theories would call for. Such official backing for liberal treatment of commercial users of the highways (at the expense of non-commercial users and the general taxpayers) has undoubtedly benefited shippers who use highway transportation, and also the manufacturers of commercial vehicles. Benefits to such particular interests might conceivably be conformable to the broad public interest, but such conformance is not proved.

Traffic Managers Are Not Shippers

Nor is the Interstate Commerce Commission in the exercise of its regulatory functions wholly free from this confusion of the interest of particular users of transportation with that of the people as a whole. It is an easy error to fall into—to identify the individuals and the companies who originate freight with the "public." An even easier and more frequent error is that of identifying spokesmen for shippers (traffic managers usually) with their employers. But the traffic manager is a specialist who, in a departmentalized company, may hold his job largely because of his ability to secure reductions in the unit price of the transportation he buys—and not because of any profound knowledge of the conditions which will promote the general profitability of the concern which employs him. Because of his particularistic interests—which are not always by any means the same as those of his employer—the industrial traffic manager or rate lawyer may advocate

policies which are the very opposite of the interest of shippers who actually originate the traffic. Thus the demands of the shipper's spokesman, which the Commission seems often to identify with those of the public interest, are actually twice removed from the general public interest—in that the spokesman's interest may not be the same as that of the real shipper, and the interest of the shipper may not be identical with that of the people as a whole.

The above discussion is elementary, to be sure, but it is not so elementary that it would be a waste of time to call it again and again to the attention of the public officials who enjoy almost absolute power over the nation's transportation policies. In an economy such as ours which, presumably, puts its main reliance upon private initiative, there can be but one excuse for the intrusion of political authority to limit individual economic freedom—and that is a showing that unlimited individual initiative will not adequately protect the public interest.

What Is the Purpose of Government Interference?

But what if the government, having found an opening where there is some excuse for its invasion of the field of economic enterprise, proceeds to advance, not the general welfare, but rather the particular selfish interests of politically powerful or oratorically gifted groups? The result of such a misdirection by government officials of their functions will be exactly the same perversion of the public interest which government intervention was intended to cure. As far as the public interest is concerned, what essential difference does it make whether "robber barons" who might be in control of unregulated railroads should make off with revenues which in economic justice ought to be passed on to the consuming public in lower rates and prices; or whether, instead, the taxpaying public is mulcted to provide free waterway transportation and below-cost highway transportation to large corporate shippers?

Would anyone like to try to prove that the general public would be worse off today, left to the mercy of unregulated railroads, than it actually is, supporting tax-built waterways and highways, and a transportation plant vastly larger than the country requires?

We are not presenting a "reactionary" argument here. A monopolistic enterprise needs to have direction of a higher order than the possible selfish greed of its managers and owners. But government ownership and

management of transportation facilities (as witness the inland waterways and the highways) may be carried on quite as much for the primary benefit of special interests, rather than the general welfare, as if the facilities were privately owned and unregulated. Similarly, government regulation of private transportation companies may operate to protect special interests which need no protection in the public interest, while it neglects to protect interests which do need protection. (Is it not a little absurd, for example, to provide federal regulatory authority to prevent the highly competitive railroads from working any injustice upon industries which are monopolistic—while there is no such protection whatsoever of the railroads against industries which are more powerful in every way than the railroads are?)

The public interest is suffering—not so much from the fact that government authority has modified the system of free private enterprise in transportation, as it is from the fact that government authority is not being exercised in the general public interest (at least, not often) but rather that its primary concern has been the interest of particularistic groups. However desirable in the abstract, it would be quixotic to expect the government to withdraw its participation in transportation. While the nature and extent of its usurpation needs constant critical scrutiny, nevertheless, the development of highways and waterways has made it impractical for the government to withdraw entirely, leaving transportation free to private enterprise.

How Government Can Protect the Public Interest

The practical solution, then, should be the recasting of government policies, methods and personnel to fit the requirements of the government's legitimate function in transportation, namely, the protection of the public interest. It is to correct the obvious failure of present governmental dealing with transportation to safeguard this interest that the President's committee-of-six recommended the establishment of a "Transportation Board," which would have the duty of examining into the relative economy and efficiency of all agencies of transport. Having all such agencies under its scrutiny, such a board would probably avoid the egregious economic error which has been committed under the present practice of entrusting each form of transport to a separate authority; with the result that each is developed and extended without any reference to the others.

It is not only, however, in the independent development of each agency of transport—without reference to the existence of the others—that government policy with respect to transportation has grossly failed to serve the national welfare. Less obvious, but none the less true, is the fact that existing regulation of transportation rates is directed more to the fostering of particularistic and local interests than to that of national well-being as a whole. On this phase of the failure of government intrusion into transportation to fulfill its proper functions, we shall have something to say in this space in next week's issue.

More Consistent Cleanliness

Since the advent of air conditioning for railway passenger cars, there has been a growing consciousness of the need for, and the possibilities of, merchandizing efforts to bring back a portion of the passenger traffic lost by the rails to other agencies. Air conditioning, which, at the outset, reduced the discomfort of travel during the heat of summer, soon took in ventilation as well and effectively sealed passenger-car interiors against the inflow of fine cinders and dust during all seasons of the year. Marked improvements have also been effected in smooth and comfortable riding of passenger trains by improvements in truck design as well as in couplers and draft gears.

De luxe service for the coach passenger includes many other attractions. Among them are the free choice of colors for interior decoration, the use of drapes, improved seat designs, variety of patterns and colors of upholstery materials, improvements in the attractiveness and effectiveness of lighting, and the installation of lounges, in coaches. Such attractions as low-priced meal service, club facilities, and special maid service are included in de luxe coach trains like the Challenger on the Chicago & North Western-Union Pacific-Southern Pacific, the El Capitan on the Santa Fe, and the recently installed Silver Meteor on the Seaboard Air Line.

These developments are all evidence of a changing attitude toward the coach passenger. During the years of peak passenger traffic and the period of decline which set in after 1920, little real attention was paid to his comfort. Passengers of taste were supposed to ride in Pullmans, and most of the attention of railway officers was devoted to catering to them.

American standards of personal cleanliness are constantly becoming higher and have been doing so for many years. Notwithstanding the striking evidences that the railroads are aware of this fact, there are still many signs that the old psychology lingers on out-of-the-way branch lines and even on main-line local trains. Too many coaches on such trains are so dirty and evil-smelling that even hardened travelers dislike to ride in them—and where bus service is available, they refuse to do so. There is the case of the man, a regular traveler, whose rail experience was confined to occasional local trips when he missed the bus, who chose the bus for a long-distance pleasure trip in preference to the train because he associated dirt with all railroad service.

Obviously, on lines where old cars, not yet air conditioned, are in operation, the spotlessness of the new de luxe coaches cannot be maintained throughout a rail journey. It should be possible, however, to keep them clean enough to start out free from offensive odors. Certainly the standard should be as high as that maintained on the buses with which such cars compete.

It is a curious fact that, in the comparison of costs

in a case where new motor-operated equipment replaced steam in local service, the only item of expense in which the new equipment shows an increase is in the item of coach cleaning and supplies. An expenditure of \$142 a month for steam trains was increased to \$270 a month for the motor cars which replaced them.

Twenty years ago this comment could have been concluded by asking: "Must the traveling public await the opportunity to ride in new cars before it can enjoy the luxury of cleanliness?" But, today, the traveling public doesn't *have* to travel in railroad cars of any kind, and cleanliness is no longer a luxury.

Maintenance Will Be Larger in 1939

The year 1939 will be one of expanding activity in railway maintenance of way. This is indicated by the larger purchases of rail that are being made, compared with last year, as well as by the larger number of roads that are placing orders for their 1939 rail requirements. Prior to March 1, definite orders had already been placed for 25 per cent more rail than was purchased during all of 1938; others were pending for large additional tonnages and a number of other roads were expecting to enter the market as soon as their budgets are approved, with orders of sufficient magnitude to bring the purchases for 1939 to more than twice the *total purchases* of rail for 1938.

Since railway net operating income is now running more than twice that of a year ago, with prospects that it will go still higher; since maintenance appropriations invariably increase or decrease as net operating income rises or falls; and since the amount of rail laid in any year presents the most reliable index of maintenance activities as a whole for that year, all signs point to a revival of maintenance activity to a level only slightly below that of 1937, the best year in this respect since 1931.

Further confirmation of this forecast will be found in an article on a following page, in which it is shown, based on information received from ranking maintenance officers of 46 representative roads, comprising more than 174,000 miles of lines, that present plans call for an increase in expenditures of \$45,000,000 to \$50,000,000 over those for 1938, thus bringing the total for the year approximately to that for 1937. More specifically, more than 600,000 tons of rail have already been purchased or authorized, and a sufficient number of roads are yet to be heard from to bring the total for the year close to 1,000,000 tons, compared with 400,000 tons in 1938. Likewise, more than twice as much work equipment has been authorized as was purchased in 1938, bringing this item almost to the level of 1937, in which year the expenditures for work equipment alone reached \$5,000,000.

Ballast application will exceed that of 1938 by more

than 1,000,000 yards and tie renewals will be considerably greater than last year. Paralleling the increased tonnage of rail, there will be corresponding increases in purchases of rail fastenings, tie plates, anti-creepers and other incidental items of track materials. A number of important bridges are scheduled for renewal, others will be strengthened and routine bridge maintenance will be expanded. Improved signaling, aggregating a substantial mileage, is also included in the budgets for the current year, while these budgets also contain increases covering every other phase of maintenance requirements.

That the railways are eager to maintain their properties to high standards is obvious to anyone familiar with railway operation or with the attitude of railway management. That they have been compelled by reason of conditions beyond their control to curtail the maintenance of many facilities where this could be done without affecting safety or interfering with train operation, is well known to students of railway affairs. Yet what most of them do not know, and what many railway officers do not themselves fully realize, is the magnitude of this deferred maintenance.

Regardless of this lack of appreciation, railway managements have and are demonstrating that they stand ready to utilize to the maximum increased earnings as they become available, to improve the condition of their properties by corresponding increases in their appropriations for maintenance and for equally needed improvements. It is because of this readiness to go to the limit of their resources that both maintenance officers and supply manufacturers are facing a year of activity that has been exceeded only once in the last eight years.

Signal Detectors Protect Track and Bridges

Experience during the last few years has proved that special detector devices, which control automatic wayside signals, can be used economically to give warnings of equipment dragging from trains, rocks falling on tracks, fires in tunnels and on bridges, and flood conditions at bridges or along fills adjacent to streams, as well as of improper alinement of bridge piers, girders and spans.

A fence so arranged along a railroad track that a rock falling from the bluff will strike it and open circuit controllers, causing wayside signals to display restrictive aspects, constitutes, in brief, a rock-slide fence. The general principles of such an arrangement were covered by a patent issued in 1883. As protection against falling rocks, the New York Central installed a line wire along bluffs adjacent to its tracks at Spuyten Duyvil, near New York City, in 1900. The Northern Pacific developed a system of detector fences and made its first installation in 1922. Since that time a number of roads have installed rock-slide detector fences of

various types to meet the conditions encountered at different locations.

Following the occurrence of several bridge failures, caused by floods, fire and mis-alinement of piers and girders, in recent years, investigations were made to determine whether it was practicable to develop devices to detect these hazardous conditions and cause signals to be set to stop trains, as well as to give warnings in remote offices. Since 1928, the Louisville & Nashville has had a fire-detector circuit in service on a long trestle near Nashville, Tenn., the controls being so arranged that, in case of fire, a circuit is opened, causing a warning to be sounded in a yard office four miles away. The Southern Pacific has several fire-detection installations in service on bridges, as well as in snow sheds and in tunnels with wooden linings. In 1922, it developed and installed a device that detected flood conditions adjacent to its track near Lathrop, Cal., and since that time has made similar installations at 14 other points on its lines. Other roads, including the Missouri Pacific, have become interested in this phase of protection and are now installing several flood detectors.

Since 1933, the Southern Pacific has had in service an installation that includes two types of bridge alinement detectors, one of which detects the vertical alinement of piers, while the other detects the relative positions of abutments and girders or spans. Several years ago, the Delaware, Lackawanna & Western, as well as the Pennsylvania, working practically independently, developed devices which would be operated by defective brake rigging or other equipment dragging from trains. The Pennsylvania and a few other roads have made numerous installations of these devices which set signals at restrictive aspects when operated. As a general rule, the detectors are located in the approach to important bridges where derailments would be especially disastrous, and in the approach to interlockings where the rails of turnouts may deflect the dragging equipment under the wheel, thus causing derailments.

Through these various means, wayside signals can be utilized effectively on a 24-hr. basis to improve safety of train operation, while records of installation costs, maintenance expenses, and the number of times the detectors operate, show that this protection is justified economically in many locations.

What Will the Traffic Bear?—4

In the three preceding installments of this series of queries the question has been raised whether the failure of the railroads' pricing structure fairly to recognize railroad costs and the costs by truck, does not leave the rail structure wide open as a boot-jack to competitive raids by trucks. Further, it has been asked whether the rate structure does not permit the trucks promiscuously and profitably to select a great volume of traffic at rates unconscionably high in relation to their costs within a radius of 1,000 miles—leaving the unprofitable traffic for the railroads to haul.

Finally, it has been suggested that this highly profitable back-log of traffic enables trucks further to hand-pick low-grade traffic for return loads, which net a bare profit over labor and fuel costs—enabling trucks to engage in transportation far beyond their true economic radius and further to cut into a large volume of low-grade traffic to which trucks have no economic right.

No one has risen to dispute these allegations; and the conclusion is that all of them must be answered in the affirmative.

Is not prompt and sound correction of this condition of vital importance to the well-being of the railroads? A recent report of the Bureau of Statistics of the Interstate Commerce Commission, using 1928 as the base, shows that the annual volume of freight moving by rail would have been 182,000,000 tons greater in 1937 had it not been for the diversion of traffic to competitors, the relocation of industry, and other economic changes which have occurred since 1928, having nothing to do with the volume of production. This report shows that the revenue loss to the railroads in 1937 due to these changes was \$523 millions, and

this enormous loss takes no account of the revenue loss by rate reductions on traffic retained on the rails, estimated between \$254 and \$526 millions annually. The railroads have also lost \$25 millions of annual revenue from milk and cream traffic in baggage service.

This report shows that, as a rule, *by far the greatest losses have occurred in the traffic most susceptible to truck movement.*

It is well-known that the railroads had lost considerable traffic even before 1928. A previous report by the Bureau of Statistics showed that the railroads were losing 196,000,000 tons annually in 1936 from these causes, with 1923-25 taken as the base.

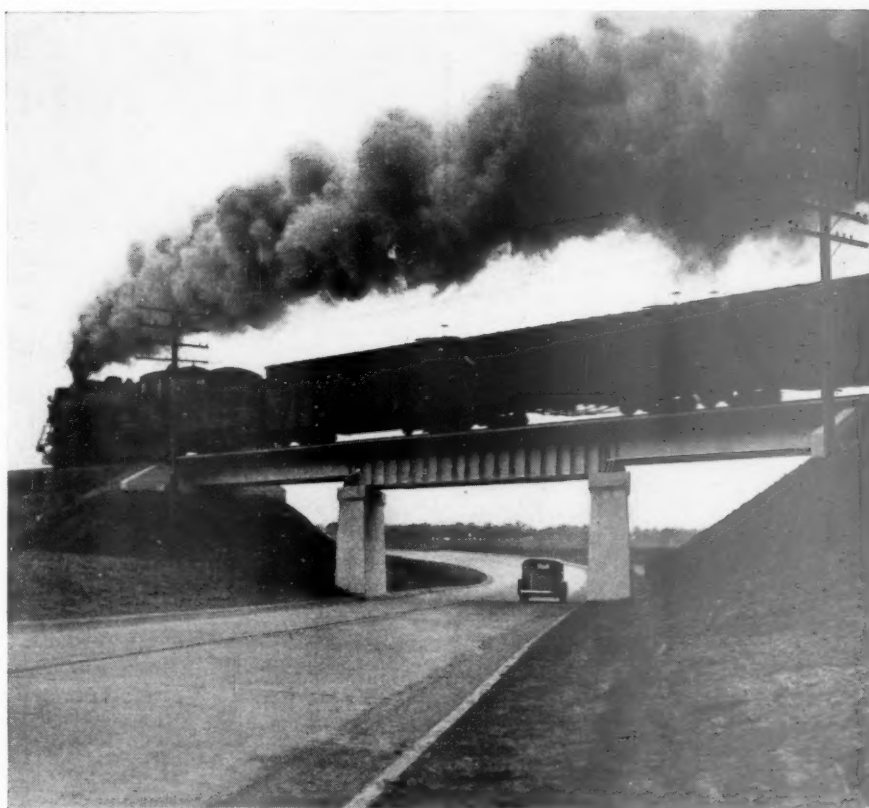
Current statistics disclose that railroad loadings of merchandise and miscellaneous freight for November were 4.9 per cent behind the previous year, while trucks enjoyed a 19.4 per cent increase. In December, rail merchandise loadings (the best indication of the effect of truck competition) showed a 4.6 per cent increase over 1937, but trucks showed a 22.24 per cent increase in their merchandise loadings.

Must the railroads permanently lose, as they are now losing, almost a billion dollars in annual revenue to the causes outlined by the Bureau of Statistics? The answer is NO!—because the loss at its present magnitude has been occasioned, not by the railroads' becoming economically outmoded, but by a pricing structure which does not meet present-day competitive realities. Creative imagination in the development of a rate structure which will put traffic back on the rails is what the situation needs. Such a rate structure is attainable—if the task is approached without predispositions and prejudices, and in the spirit of common-sense co-operation.

Federal Grade Crossing Program Moves Steadily Forward

Extensive experience results in more efficient handling of projects — Priority of future projects to be established by planning survey

An Underpass on the Fort Worth & Denver City Near Bowie, Tex.*



BENEFITING by a higher degree of co-operation between the various agencies involved, greater familiarity on the part of these same agencies with required procedure, and the development as a result of extended experience of more smoothly operating machinery for initiating and carrying out individual projects, the grade crossing elimination and protection program of the federal government is now moving forward on a comparatively orderly and efficient basis. To be sure, troublesome delays still occur in the initiation of programs and some states have lagged behind in converting their allotments into completed projects, but on the whole it can be said that much of the confusion and other causes for delays that were in evidence during the early years have given away to a clearer understanding of the requirements and objectives of the federal program to the end that a sound basis for more satisfactory progress has been laid.

Another development that should be a cause for satisfaction among railway men is the growing acceptance in many quarters of the thesis that to require the railroads to share substantially in the cost of eliminating grade crossings results in the imposition of an unfair burden on their financial structures. In-so-far as the federal government is concerned, this change of sentiment has manifested itself in legislation authorizing the appropriation of funds directly for paying the entire cost (except land and certain other charges) of grade elimination and pro-

tection projects, and legislation currently effective makes provision for continuing this policy through the fiscal year 1941, with at least a reasonable prospect that it will be extended still further.

Thus, with the continuance of the program assured for some years to come, the way has been cleared for a systematic approach to the problem of grade crossing elimination and protection on a nation-wide long-range basis. In fact, steps have already been taken, as explained later in more detail, to determine by means of planning surveys the relative importance of all the remaining grade crossings in the respective states for the purpose of establishing their priority for elimination or protection.

Origin of Program

The grade crossing elimination and protection work now in progress in the federal program is being carried out under a number of different legislative acts. The program had its origin in the National Industrial Recovery Act of 1933, Title II of which authorized the states to apply to grade separation and protection any amount of their allotments from the \$400,000,000 highway appropriation provided for in that law. For continuing the program thus initiated an additional \$200,000,000 was made available in the Hayden-Cartwright Act of 1934.

Under the terms of these acts a total of 702 grade crossing elimination structures had been approved for construction at a total cost of \$33,363,712 as of January

* All photographs of grade separation structures by courtesy U. S. Bureau of Public Roads.

Status of United States Works Program and Federal-Aid Grade Crossing Projects for all States as of January 31, 1939

	Completed					Under Construction					Approved for Construction					Balance of Funds available for programmed projects
	Estimated Total Cost	Federal Funds	Number of Crossings			Estimated Total Cost	Federal Funds	Number of Crossings			Estimated Total Cost	Federal Funds	Number of Crossings			
			Eliminated by Separation or Relocation	Reconstructed	Protected			Separation or Relocation	Reconstruction	Protection			Separation or Relocation	Reconstruction	Protection	
Works Program Projects*	\$181,690,299	\$176,071,050	1,958	368	946	\$13,654,957	\$12,863,581	86	16	134	\$2,259,281	\$1,726,901	25	2	72	\$5,339,278
Federal-Aid Projects†	\$11,563,422	\$11,359,935	130	44	154	\$24,277,470	\$23,576,540	217	49	198	\$12,328,065	\$11,845,825	127	19	311	\$71,377,137‡
Totals	\$193,253,721	\$187,430,985	2,088	412	1,100	\$37,932,427	\$36,440,121	303	65	332	\$14,587,346	\$13,571,916	152	21	383	\$76,716,415

*As provided by the Emergency Relief Appropriation Act of 1935
 †As provided by the Hayden-Cartwright Acts of 1936 and 1937
 ‡Includes apportionment for fiscal year 1940

31 of this year, while other projects had been approved providing for grade crossing protection installations at 706 locations at a cost of \$1,589,970. Also, plans had been approved for the elimination of 169 grade crossings by the relocation of highways. Most of the work in this program has been completed. It will be noted that the foregoing figures applying to grade separations represent the number of grade crossing elimination structures rather than the number of crossings to be eliminated and for this reason it is not possible to lump them with the figures given later showing the number of crossings that have been eliminated in accordance with programs set up by subsequent acts of Congress. The foregoing figures, as well as those given in the following, are based on statistics compiled by the Bureau of Public Roads.

The expenditure of funds made available by the National Industrial Recovery Act for eliminating and protecting railroad-highway grade crossings was received with such universal approval that, when an appropriation of \$4,880,000,000 was authorized in 1935 (Federal Emergency Relief Appropriation Act) to further an extensive campaign for relieving unemployment, a total of \$200,000,000 was earmarked by the President for exclusive use in separating grades, reconstructing existing grade separations, relocating highways to eliminate crossings, and in installing automatic protective devices at crossings. The act provided that one-half the \$200,000,000 fund be distributed among the states on the basis of population, one-quarter on the basis of railroad mileage and one-quarter on the mileage of the federal-aid highway system. As in the previous legislation it was also specified that the funds thus authorized were available for defraying the entire costs of crossing projects except

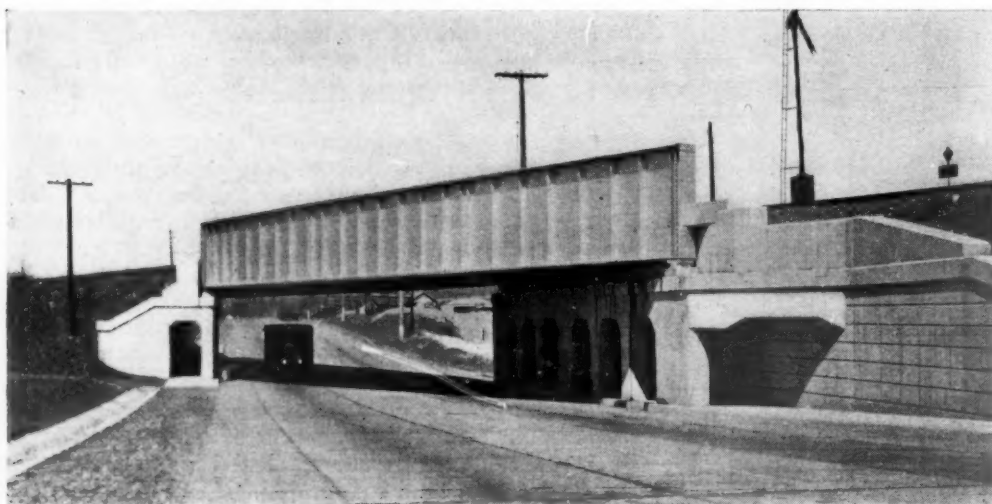
those incurred by the acquisition of land and certain others.

"Make-Work" Rules Retard Program

While the machinery thus appeared to be in readiness for the immediate inauguration of construction activity on a large scale, the program was delayed nearly six months because of the retarding influence of certain "make-work" rules governing expenditure of the funds. However, it quickly became evident that the work would remain practically at a standstill as long as these rules were continued in effect and as a consequence they were either revoked or so altered as to remove the objectionable provisions.

Following these changes in the rules, the program moved forward with a fair degree of rapidity. By January 31 of this year all but \$5,339,278 of the appropriation of \$200,000,000 had been earmarked for individual projects that were covered by approved plans. In most instances the balances in the individual states which go to make up this total of unassigned funds represent accruals that have occurred through the release of funds as a result of the completion of projects at less than the original estimated cost.

The status as of January 31 of the grade crossing program (Works Program) set up by the 1935 act is shown in the top line of the accompanying table. It will be noted from this table that completed projects undertaken as a part of this program have resulted in the elimination of 1,958 grade crossings, the reconstruction of 368 existing structures and the installation of protective devices at 946 other crossings, the estimated total cost of



Through Plate-Girder Span Over a Highway at Scotia, N. Y.

these projects being \$181,690,299. As of the same date, the projects under construction had a total estimated cost of \$13,654,957, while those that had been approved for construction but on which work had not yet been undertaken had a total estimated cost of \$2,259,281. From a study of these figures, it is evident that within a relatively short time the last of the projects undertaken as a part of the Works Program will have been completed. It will also be recalled that the act of 1935 set aside another \$200,000,000 for highway work and that part of this sum was expended for grade separation projects, although figures showing the extent that it was used for this purpose are not readily available.

The Program Continued

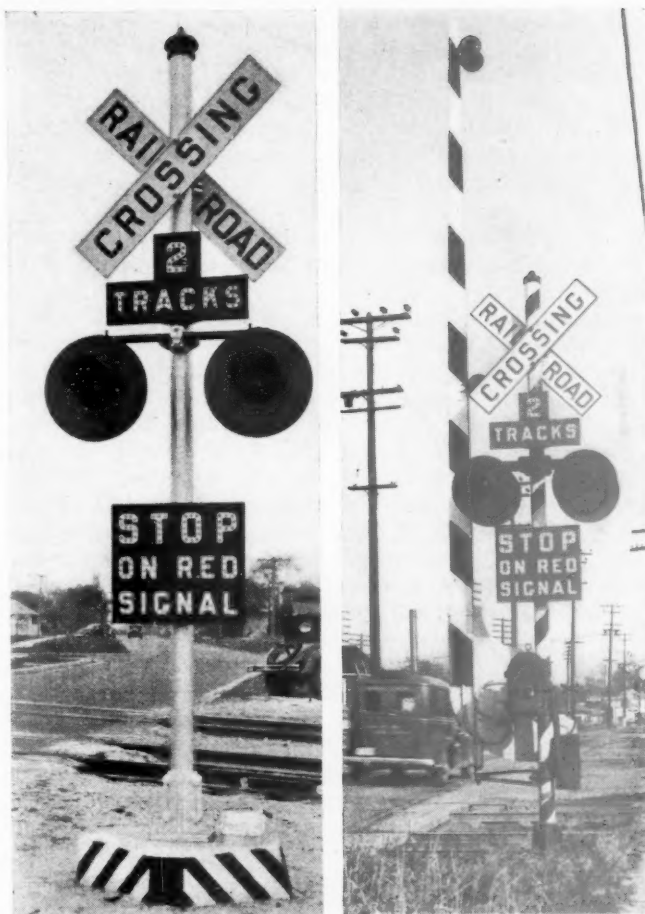
It was while the grade crossing phase of the Works Program was at its height in 1936, that a desire became evident in Congress to perpetuate the program on substantially the same basis for at least several years. Expression was given to this sentiment by passage of the Hayden-Cartwright Act of 1936, which authorized federal appropriations for grade crossing purposes of \$50,000,000 each for the fiscal years 1938 and 1939. The act authorizing these appropriations provided that the funds be apportioned to the states in the same manner as stipulated for the Works Program and that they be used for the same purposes, with the additional provision that they be made available also for the elimination of grade crossings by the relocation of lines of railroad. For the continuation of the program during 1940 and 1941, another act was passed in 1938, which authorized the appropriation of \$20,000,000 for 1940 and \$30,000,000 for 1941.

Substantially all of the funds provided for the fiscal year 1938 in the act of 1936 have been programmed, that is, assigned to individual projects that have received the approval of the Bureau of Public Roads, and \$41,400,000 of the 1939 funds had similarly been programmed as of January 31. As yet, none of the 1940 funds has been programmed. As distinguished from the Works Program initiated by the Federal Emergency Relief Appropriation Act of 1935, those projects undertaken in accordance with the acts of 1936 and 1938 are referred to as "Federal-Aid" projects.

Status of Federal-Aid Program

The status of the Federal-Aid program for the country as a whole as of January 31, is shown in the second line of the table. It will be noted that as of this date projects had been completed which resulted in the elimination of 130 grade crossings by separation or relocation, the rebuilding of 44 existing structures and the protection of 154 crossings, the total estimated cost of these projects being \$11,563,422. On the same date, projects having a total estimated cost of \$24,277,470 were under construction, while others having an estimated cost of \$12,328,065 had been approved for construction but had not yet reached the construction stage.

A recapitulation of the work done under both the Works Program and the Federal-Aid Program shows that projects have been completed involving the elimination of a total of 2,088 grade crossings, while 412 grade separation structures have been rebuilt and 1,100 crossings have been protected, at a total cost of \$193,253,721. If to these figures were added the number of crossings eliminated or protected as a part of the program set up by the National Industrial Recovery Act of 1933 and the Hayden-Cartwright Act of 1934, the totals become imposing indeed, although, as pointed out pre-



Left—Standard Flashing-Light Signal With Reflector-Button-Type "Stop on Red Signal" Sign. Right—Showing a Short-Arm Crossing Gate Used in Conjunction With Standard Flashing-Light Crossing Signal

viously, it is not possible to do this with the grade crossing elimination figures because of the different manner in which the statistics have been compiled.

On the basis of the foregoing figures, it is evident that, for the country as a whole, the grade crossing program has progressed in a reasonably expeditious manner, and general satisfaction with the handling of the work and with the sincere desire to co-operate that has been in evidence on all sides has been expressed by representatives of the Bureau of Public Roads, which administers the funds, and the railroads. For instance, Thomas H. MacDonald, chief of the Bureau of Public Roads, while testifying during a congressional hearing on one of the Hayden-Cartwright bills, said: "The states and the railroad companies, I feel, have worked very closely and harmoniously . . . and there has been a spirit of co-operation that has been very pleasing. It is a remarkable fact that we have not had a major dispute occur in setting up \$150,000,000 to individual projects, involving all the railroads of the country." At the same hearing, R. V. Fletcher, general counsel of the Association of American Railroads, expressed the "gratification of the railroad industry for the co-operation which has been given by the Bureau of Public Roads and the splendid work done by the bureau under Mr. MacDonald's superintendence."

Progress Slow in Some States

However, it is apparent from an examination of statistics showing the status of the work that in some states the progress made in putting grade crossing allotments

to work has not taken place at the same rate as in others. For instance, with an apportionment of \$4,895,949 of Works Program funds (made in 1935) Georgia, on January 31, still had \$1,450,750 of this amount assigned to projects for which plans had not yet been approved, and had completed projects having a total estimated cost of only \$2,252,068. On the other hand, Illinois, with an apportionment of \$10,307,184, had practically all of this amount assigned to approved projects and had actually completed projects having a total estimated cost of \$9,522,545.

Georgia also appears among those states that have been slow to spend the allotments made available under the Hayden-Cartwright Act of 1936. Although these funds (for the fiscal year 1938) were made available on January 1, 1937, a total of ten states, including Arizona, Connecticut, Florida, Georgia, Louisiana, Maryland, Ohio, Oklahoma, Rhode Island and Tennessee, had not completed any projects with them by January 31 of this year. However, in each case except Connecticut a considerable proportion of the individual apportionment had been assigned to approved projects and substantial amounts of work had reached the construction stage. As a contrast, Iowa, as of January 31, had brought to conclusion work under this program having a total cost of \$1,252,401, including projects involving the elimination of 14 grade crossings, the protection of 20 crossings and the reconstruction of 4 grade crossing structures. Substantial progress has also been made in a number of other states, notable among which are California, Indiana, Michigan and New York.

Nature of Delays

The delays that have affected entire state programs may be attributed to a number of factors, some of which are political in nature while others have had their origin in conditions within the respective state highway departments. At this point it should be mentioned that the highway departments are charged with the responsibility of initiating projects, preparing the plans, advertising for bids and awarding the contracts, subject to the review and approval of the Bureau of Public Roads.

Delays that have occurred in getting individual projects into the construction stage have been occasioned by a variety of factors. Prominent among these is the difficulty that has been encountered frequently in obtaining necessary additional property, which in some instances has involved court proceedings. Protracted negotiations with representatives of public utilities made necessary by proposed alterations in their facilities have comprised

another retarding influence. Also, sight should not be lost of the fact that during the early stages of the grade crossing program, when the need was imperative for getting work under way without delay, attention was concentrated on the less complicated projects, generally in rural districts, that were susceptible of expeditious handling, while at present major attention is being given to large-scale projects in cities which necessarily progress more slowly.

There are several reasons for the concentration of activity in urban centers. In the first place many of the more dangerous crossings in rural districts have been eliminated and, to keep the program moving, it has been necessary to transfer attention to the large urban centers where, because of the scope and complexity of proposed grade separation projects, relatively little work of this character has as yet been done under the federal programs. Secondly, the conduct of large-scale grade separation work in large cities offers a means of relieving the unemployment situation in localities where it is present in its most aggravated form.

Situation in Large Cities

As a matter of fact, the situation that exists generally in large centers of population is now coming in for careful consideration on the part of the Bureau of Public Roads under the direction of Mr. MacDonald. A characteristic that is common to most large cities is the fact that the central business, shopping and financial district is usually immediately surrounded by a congested area generally embodying greatly-depreciated property, where railroad lines extending to the central district generally remain at the street grade. Here the problem is not only to achieve a separation of grades as between cross streets and the railroads but also to apply similar treatment to arterial thoroughfares extending between the central district and outlying suburbs. These are now being viewed as associated problems and, in many instances, it is considered desirable to place vehicular thoroughfares and railroads side by side, preferably at a slightly depressed grade with cross streets extending overhead.

Treatment of this character obviously involves the acquisition of considerable property, and this is considered to be the most formidable obstacle to the successful consummation of such projects. As a possible solution of this problem consideration is being given to the feasibility of establishing a federal credit authority which would arrange for acquisition of the necessary property with federal funds, the government later to be reimbursed on a long-term basis. A noteworthy aspect



A Highway Overpass Near Arcadia, Fla.

of this plan is the fact that it would necessarily involve a review of improvement projects by the authority, with the result that the latter would serve as an agency for the effective co-ordination of such projects and their development along lines most favorable from the standpoint of city planning.

Planning Survey

As mentioned at the outset, another aspect of the federal grade crossing program that is being given careful consideration at this time is the desirability of determining the relative importance of crossings in order to establish a basis for their elimination in the order of priority. Such an approach to the problem has been made possible, if not necessary, by assurance that the program is to be continued for at least several years yet and possibly longer. For the purpose of collecting all information necessary to establish the relative importance of crossings, the Bureau of Public Roads, collaborating with the Grade Crossing committee of the Association of American Railroads, has already undertaken a nationwide planning survey.

By means of this survey such pertinent information is being acquired as the number and character of trains passing over each crossing, the number of motor vehicles using the highway, the accident record at the crossing and the physical characteristics of the intersection, such as the approach grades of the highway, the angle of the crossing and the extent to which the tracks are visible from the highway. The railroads have been asked to co-operate in this survey to the extent of furnishing the information relative to the number and character of trains, while all the other data required are being obtained from the state highway departments.

With this information in hand it has been suggested that a formula could be evolved giving due consideration to all the factors involved, the application of which to any group of crossings would give a fair index of the relative hazard and importance of the individual crossings in the group. It is not contemplated that the index of importance established by the formula would comprise the sole basis for determining the priority of projects; rather it would be used simply as a guide or yardstick and would be subject to modification under certain conditions. It is the belief in the Bureau of Public Roads that application of the formula on a national scale would result in an equitable distribution of grade crossing funds among the railroads, although in individual states it is conceivable that, on the basis of railroad mileage (the present basis of distribution), inequalities might develop from time to time. Since all the survey data must be in hand before work on the formula can proceed, the Bureau is urging the railroads to send in the information applying to crossings on their lines as quickly as possible.

Progress in Crossing Protection

Progress in the protection of grade crossings has varied widely in the various states. Considering all the federal programs it is apparent that Illinois is far in the lead in this respect. As of January 31, a total of 344 such projects in this state had either been completed or were under construction or on the approved list, although the great majority of them had been completed. On the same basis, Indiana was second with 306 projects, North Carolina was third with 242 and Texas was fourth with 149. In contrast to the progress evidenced in these states is that made in New Jersey, Connecticut and Massachusetts, in each of which only one crossing protection proj-



An Underpass at Palo Alto, Cal.

ect had been undertaken during all the federal programs. In five states (Louisiana, Missouri, Montana, North Dakota and Rhode Island) no projects whatever had even reached the "approved for construction" stage.

Rules and regulations of the Bureau of Public Roads governing the expenditure of federal funds for grade crossing purposes specify that the protective devices installed shall consist of approved types of flashing-light or wigwag signals. When the latter type of signal is used, it is specified that it shall be of the magnetic type, having standard signs and mounting height, a balanced outline reasonably in keeping with stationary lights and with an aspect, when in operation, essentially the same as flashing lights. If additional protection is desired the use of crossing gates or other devices is permissible.

Figures Not Available

Figures are not available showing the extent to which the various approved protective devices have been installed but it appears that the flashing-light signal has been received with particular favor. A considerable number of protective devices of the barrier type have been installed and recently two experimental installations of a new-type barrier have been put in with the approval of the Bureau of Public Roads. In connection with crossing protection matters, the bureau has concerned itself mainly with the problem of assuring that the devices installed for this purpose present a uniform aspect. Also, on a number of occasions it has recommended supplementary protective devices, such as short gate arms, in addition to flashing lights.

During the early stages of the crossing protection program, this phase of the work was subjected to considerable delay in many instances because of the complicated methods employed in awarding contracts for the necessary parts and materials. This situation was due to the fact that a large number of items are involved in such installations and in many cases it was the practice to give all qualified manufacturers an opportunity to bid on the various items.

Recognizing the need for establishing a basis for the receipt of bids for materials that would afford all manufacturers of satisfactory products an opportunity to compete for the business and which, at the same time, would simplify the procedure, the bureau issued a memorandum outlining a minimum grouping of items or materials for bid purposes. Twelve groupings of materials were specified and it was pointed out that bids may be received in such a manner that the total sum of the low group bids may be compared with a single lump sum bid for all of the material in the different groups. Also it was stipu-

(Continued on page 423)

\$45,000,000 More for Maintenance in 1939



WITH net operating income larger than at any time since the beginning of 1937, railway officers are preparing for a year of greater activity in maintenance. This is indicated by the fact that the number of work equipment units included in 1939 budgets is double that purchased in 1938; by the further fact that the rail orders already placed or authorized for this year's renewals exceed by 50 per cent the total amount of rail purchased during all of 1938, with many orders still pending; and by the still further and more direct evidence that the maintenance budgets as a whole will be increased on many roads by amounts ranging from 5 to as much as 100 per cent, compared with 1938.

These statements are based on information given us by the chief engineers and engineers maintenance of way of 46 representative railways in the United States representing more than 174,000 miles of lines, and 2 in Canada. Twenty-two of these officers state definitely that their maintenance programs for 1939 will be larger than in 1938 and while some of them rated these increases in the percentages that have been cited, others report increases

In 1939 the railways will increase their maintenance expenditures by \$45,000,000, or more than 10 per cent, over the amount spent in 1938. This will include more than double the amount of rail, an increase of more than 1,000,000 cu. yd. of ballast, 100 per cent more work equipment, enlarged programs of bridge, building and water-service maintenance, more painting, more ditching, more weed destruction, improved signals, and other items in proportion. Details of these expanded programs are presented in this article which is based on information given us by ranking maintenance officers of 46 representative railways.

ranging from \$500,000 for a road with an operating mileage of 400, to \$3,500,000 and approximately \$4,000,000 for each of two of the larger roads. Taken as a whole, these figures indicate an increase of more than 10 per cent, or \$45,000,000 to \$50,000,000 over the expenditures for 1938, bringing the total near that for 1937, the best year since 1931.

Thirteen roads reported that while in general their present plans do not contemplate larger total expenditures than were made in 1938, several of them are planning to do more work in the way of bridge maintenance or renewal, to increase their expenditures for ballast, to lay slightly more rail or to recondition more rail by welding. Eleven of the roads from which information was received have not yet completed their budgets, but with one or two exceptions they are looking forward to considerable increases. Practically all of the roads in these two groups indicated that if earnings continue at or above their present level it is more than probable that their present programs will be enlarged. Only two roads are definitely planning to spend less than in 1938 and their decreases will be represented almost entirely by decreased expenditures for rail.

Rail Renewal Increases 100 Per Cent

While the replacement of rail will constitute one of the major features of these enlarged programs, this increased activity will not be confined to any particular class of work, but will include weed destruction, ditching, strengthening of the roadbed, additional ballast, tie renewals, surfacing, building up rail joints, the maintenance and renewal of bridges, lining tunnels, building repairs, painting, water-service facilities, signals and many other items included in the multitudinous requirements for railway maintenance.

Among the conclusions to be drawn from the informa-

tion given by these officers, more than twice as much rail will be laid this year as was laid in 1938. Several roads that laid no rail in 1938 are planning to lay from 50 to 60 miles this year, while others estimate that they will lay from two to five times as much as was laid last year. Again, a number of roads that laid no rail last year and that have not yet placed orders for their 1939 rail are planning to lay substantial mileages during the year. Two roads reported that they expect to lay approximately 400 miles each, and others will lay from 100 to 300 miles.

Obviously, increasing the mileage of rail renewals increases ballast requirements, and the expected increases in this item range from 10 per cent to more than three times the amount applied in 1938, with corresponding increases in the amount of track to be surfaced out of face. In this connection, several roads report that they expect to surface considerable track out of face independent of rail renewals, applying only enough new material to complete the ballast section. A few roads reported that, having made liberal applications of ballast last year, they will continue their ballasting programs this year on a somewhat reduced scale. Based on present plans, as reported by these railway officers, it is estimated that the increase in ballast will amount to more than 1,000,000 cu. yd.

It is recognized that to insure the greatest benefit from the application of ballast, drainage must be dependable and adequate and that the roadbed must be capable of supporting the ballast shoulder. Therefore, in connection with the increased programs for ballast renewal, there should be a corresponding increase in the amount of ditching and roadbed widening, and this assumption is also confirmed by the statements of railway officers that their programs include substantially increased allowances for this class of work.

Larger Allowances for Ties

Since 1929, tie renewals for the railways as a whole have been consistently below the current mortality rate, so that at the beginning of this year the accrued deficiency in tie renewals is estimated to aggregate approximately 90,000,000 ties. For this reason, it might be expected that as earnings increase tie renewals will also increase. This assumption is confirmed by the 1939 budgets, almost all of which include substantially larger allowances for ties.

A situation exists with respect to ties similar to that with rail, with this difference that whereas the accrued deficiency in tie renewals is greater in yards and sidings than in main tracks, the deficiency in rail renewals is relatively greater in main tracks. While it is not implied that this deficiency has reached the point where safety has yet been impaired, it is widely recognized that this older rail requires far more attention than new rail, particularly if the latter is of a larger section. Reflecting this situation, and despite the larger mileage of new rail to be laid this year, not a few of the 1939 budgets include relatively larger allowances for reconditioning rail ends by welding, ranging up to double the amount of this work done in 1938. Few rail ends are built up today without the application of new, reformed or rebuilt joint bars or of joint shims, so that there will be a corresponding increase in these incidental items.

Weed Destruction to Be Increased

Important as weed destruction is considered by all experienced maintenance officers, it involves a class of work that seldom affects the safety of train operation or the free movement of traffic or induces severe deterioration

of the property, except in the ballast section. For these reasons, as appropriations for maintenance were reduced following the collapse of 1929 and continued on a reduced scale throughout the depression, efforts to destroy or control weeds practically ceased on many roads, and, particularly on branch lines, little has been done along this line, except as was necessary to comply with state laws relating to noxious weeds.

That a much greater amount of this work is in contemplation this year is indicated by the fact that 65 machines adapted for weed control are included in the 1939 budgets, in addition to which a number of roads are expecting to employ chemical methods more extensively for weed control during the year. The fact that railway officers are adding a materially larger amount of weed control work to their maintenance-of-way budgets is in itself an interesting indication of the greater degree of optimism that is manifesting itself in other ways.

Among the remaining items that have been included in the 1939 budgets, repairs to and replacement of bridges constitutes one of the larger items with respect to the amount of money involved. Work of considerable magnitude is planned by a number of roads in the way of strengthening some of their lighter structures and particularly in the replacement of spans that are becoming too light for the loading that is being imposed upon them. Others are planning increases in the routine maintenance of both steel and timber structures. This latter statement is confirmed by the inclusion in the budgets of a substantial increase in the number of portable power tools that are contemplated for the use of bridge and building gangs, for the work-equipment budgets given us include 63 complete sets of these power tools, 10 electric generators and 14 air compressors, together with 20 power saws and 75 wood borers, in addition to those included in the 63 sets of such tools.

Buildings have been neglected during the depression until a large amount of deferred maintenance has accrued. While only two of the roads included in this survey expressed an intention of increasing their building work enough to offset any substantial amount of deferred maintenance, most of them are planning to do considerably more than they have done for several years. In connection with these repairs, there will be a corresponding increase in painting, although as in the case of building repairs, this increase will not be sufficient to wipe out a substantial amount of the deficiency that exists in this item.

Offsetting Deferred Maintenance

When requesting information concerning the maintenance budgets for 1939, the officers to whom the inquiries were addressed were asked whether their programs for the year contemplated taking up any appreciable amounts of deferred maintenance in tracks, bridges, buildings, signals and interlockings, and water service. While a few of these officers were unwilling to admit that deferred maintenance exists in these facilities on their roads, others said frankly that this was one of the objectives toward which they were striving. A few said that even with the greatly increased programs, they would be unable to offset any appreciable amount of the deferred maintenance that is confronting them. Still others reported variously that when their programs for the year are completed they will have eliminated existing deficiencies in rail, ballast, ties, buildings or bridges, or that they will have made large inroads on one or more of these items.

Railway construction has followed a consistently downward course since 1929, particularly with respect to those

large projects that were so characteristic of this activity prior to 1929, until in 1938 it reached an all-time low. As a result of this situation, there is at present a highly suppressed need for a vast program of construction that will overshadow all of those of the recent past. Recognizing this need and with a view to determining what the prospects are for an early upturn in construction activities, information was requested concerning the improvement programs of the roads included in this study.

Moderate Increase in Construction

Most of the roads reported that while they expect to increase their construction activities to some extent, no large projects are in immediate prospect. As outlined by them, this work will involve such facilities as coaling stations, water stations, increased shop facilities, heavier bridges, additional or improved signals, longer turntables, extensions to enginehouses, and other similar projects to facilitate the operation of trains or the handling of locomotives.

Superficially, it might appear that with materially increased programs for maintenance there should be a corresponding revival of construction activities. Yet this does not necessarily follow with respect to the larger projects, although it is quite true of smaller construction activities, the reason being that maintenance and large construction are financed in different ways. Maintenance costs and those for minor construction are generally paid out of current earnings, but large construction enterprises, because of the magnitude of the costs involved, are usually financed by borrowing the necessary funds. Obviously, in view of the uncertainties that exist today in the industrial field as a whole, there is little incentive for managing officers to make the large commitments for their roads, that will be required to finance major construction until they can penetrate farther into the future than is possible at this time. For these reasons it is logical for maintenance activities to increase greatly without affecting large and important construction, although the revival of activity with respect to those projects that can be financed out of earnings should be proportionate to the increase in maintenance expenditures, and this is indicated in the budgets under study.

On the other hand, there will be a continuation of the grade-separation and grade-crossing-protection work that has been so prominent a feature of railway construction in recent years. Beginning with 1936, as a result of federal appropriations amounting initially to \$200,000,000, an unprecedented amount of grade-crossing elimination and protection has been carried to completion year by year. This work for 1939, in addition to the same general classes of separations as in preceding years, also includes several important track elevation projects.

Considerable Signal Work to Be Done

Signaling will hold a prominent position in railway activities in 1939. With the vast majority of the main lines already equipped with automatic signaling, the new mileage of signaling will probably be limited to from 400 to 600 miles, which will be in sections of 20 to 50 miles each on a number of roads. Several centralized traffic control projects, 20 miles or more in length, are under way or planned. At some locations the control of two or more interlockings will be consolidated by the use of modern equipment, while at other locations outlying switches and signals will be controlled remotely from existing towers. It is expected that these projects will be pushed to completion as rapidly as possible because

of the economies they will effect in operating expenses as well as the benefits in train operations.

Much of the proposed work in this field has to do with the rehabilitation and modernization of signaling which is worn out or is not spaced properly for the high speeds at which trains are now being operated. As a general rule, such rehabilitation programs call for the replacement of semaphores with light signals, as well as new relays, wiring and other accessories, so that the completed job represents practically a new signaling system.

Automatically-controlled highway crossing protection, in the form of flashing-light signals, automatic gates, and barriers, is being installed on an extensive basis, the equipment and construction work involved representing a total expenditure equal to or greater than that of the automatic block signaling under way.

More Work Equipment

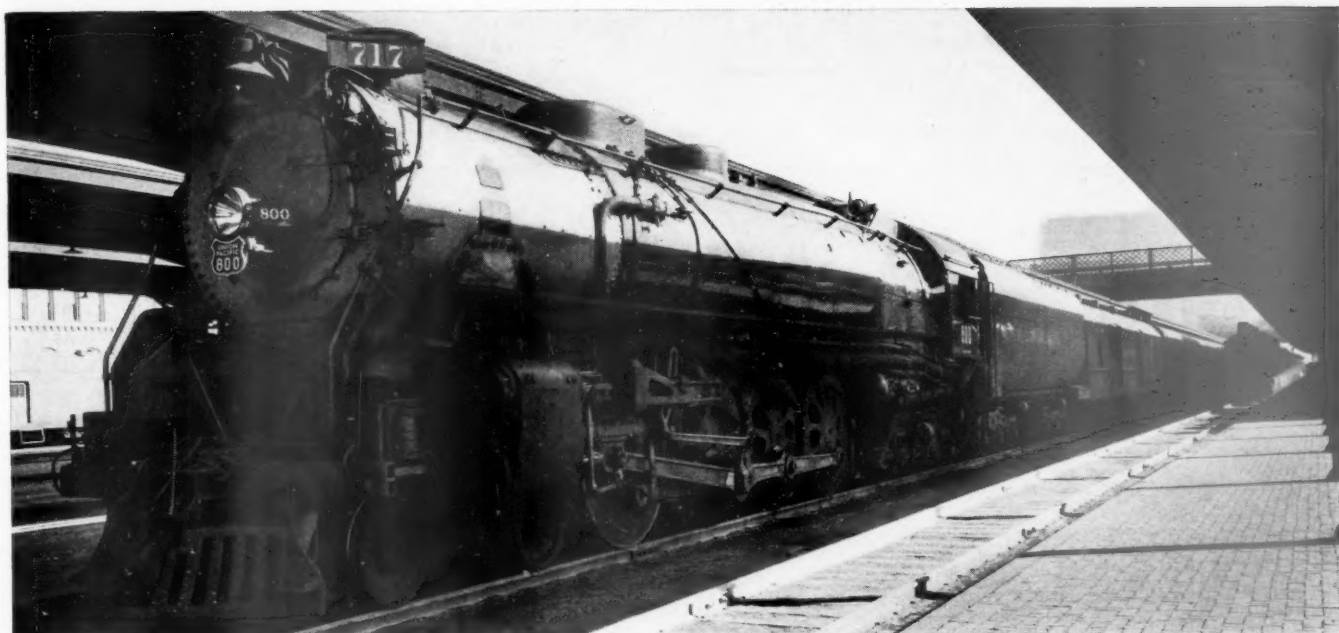
One of the outstanding features of the maintenance programs for 1939 is the large amount of work equipment to be purchased. Despite the large purchases of this equipment in 1936 and 1937 and the markedly smaller purchases of 1938, the budgets for 1939 include more than twice the amount of equipment purchased in 1938 and are only slightly below the purchases of 1937, the year of largest purchases since 1929. In other words, the railways now contemplate the purchase of 3,100 units of all types of equipment, compared with 1,376 units purchased in 1938 and with 3,310 units purchased in 1937.

As might be expected, in view of the various classes of work included in the maintenance programs for the year, the types of equipment to be purchased are as varied as the operations to be performed, and include practically the entire list of power machines and power tools available, together with a large number of types other than power machines. They include equipment for laying rail, for surfacing track, for extending the life of rail, for grading, ditching and trenching, for weed control, for maintaining bridges and buildings, for handling materials, for transporting men and materials and for a wide range of other work.

Is There More Optimism?

To sound out the sentiment among maintenance officers with respect to the future, they were asked whether the attitude of their roads was more optimistic or less so, with respect to resuming more normal maintenance and improvement programs in the near future. The replies indicated that there is, in general, a renewed spirit of optimism with respect to the near future, but few officers were willing to make long-term predictions. Obviously, in view of the events of the last 10 years, there was a note of caution in many of these replies, yet only two or three expressed downright pessimism, a few were non-committal and several were unable to state the attitude of their roads. On the whole, both the direct statements to this effect and the fact that, with the exceptions cited, the maintenance programs for the year have been greatly enlarged, lead to the conclusion that the spirit of optimism is widespread and that as earnings improve maintenance activities will increase correspondingly.

THE BUREAU OF INTERNAL REVENUE has ruled that a hospital association, maintained by a railroad which is a "carrier" as defined in Section 1 (i) of the Carriers' Taxing Act of 1937 and which was incorporated to supply hospitalization and treatment to employees of the railroad, is an "employer" within the meaning of Section 1 (a) of that act.



Union Pacific 800-Class Locomotive Leaving the Omaha Station with A Challenger Train

Intensive Locomotive Use Pays Union Pacific Big Returns

Twenty 4-8-4 type combination freight and passenger locomotives,
purchased in 1937, effect estimated annual saving
of 50.21 per cent on the investment

UNUSUALLY satisfactory operating results have been secured with the 20 new 4-8-4 type steam locomotives which were designed by Union Pacific engineers in collaboration with the American Locomotive Company and placed in service in the fall of 1937 between Omaha, Neb., and Cheyenne, Wyo., Denver, Colo., Ogden and Salt Lake, Utah, Green River, Wyo., and Huntington, Ore. These locomotives made 3,597,945 miles in heavy fast passenger service during the 12-month period ending December 31, 1938, or practically 15,000 miles per month per locomotive. They showed an availability for service of 93.4 per cent, and effected a saving in maintenance cost, as compared to previous 4-8-2 type locomotives, of 8.37 cents a mile or \$301,148.

Owing to increased capacity and ability to handle as much as 20- to 22-car trains on time, there was a saving of 1,249,030 train miles or approximately 1¼ million dollars for the calendar year. Allowing for fixed charges, including depreciation, interest on investment, and taxes, and for maintenance of equipment, the net annual savings of the 20 locomotives represented a return of 50.21 per cent on the investment.

Availability figures for new 4-8-4 800 class as compared with 4-8-2 7000 class purchased in 1922 are given in Table I which shows the substantially decreased time required for running, drop-pit and shop repairs and an increase in availability from 65.3 per cent for the old to

93.4 per cent for the new power. The average turning time for both classes of power is slightly over eight hours. While comparative fuel tests show an increased cost from 17.493 to 20.102 cents per locomotive mile for the new power this is accounted for by the substantially higher speeds and train loads handled.

With regard to repair costs, the new locomotives showed important economies, as was expected, and accumulated sufficient mileage in 1938 so that all received classified general repairs. While the maximum level of repairs will probably not be reached for another five years, the chart, illustrated in Fig. 1 and showing the cost of repairs per locomotive mile, clearly indicates that the upward trend of this cost is comparatively slow. This chart gives the cumulative cost of repairs by months during 1938, on a mileage basis, and the accumulated

Table I—Comparative Availabilities of U. P. 800-Class and 7000-Class Locomotives

	800 Class 4-8-4	7000 Class 4-8-2
Total number locomotives	20	60
Number locomotives studied	20	24
Per cent locomotives studied	100	40
Availability on basis of locomotive days, per cent:		
Available for service	93.4	65.3
Held for running repairs	2.4	15.6
Held for drop-pit repairs	2.5	6.1
Held for shop repairs	1.7	13.0

mileage made by the 20 new locomotives. During 1938 service, the average cost of running repairs for these locomotives was 9.93 cents per mile and shop repairs 3.20 cents per mile, or a total of 13.13 cents per mile,

age schedule speeds between stations and the running speeds necessary to maintain these averages are shown in Fig. 2 for a typical run westbound between Omaha and Cheyenne. The highest average schedule speed in

Table II—Comparative Boiler Performances—800-Class Locomotives with Master Mechanics' and with Economizer Front Ends

Lb. coal fired per hour	Million B.t.u. absorbed by evap. heating surface per hour.		Lb. of water evaporated [†]		Lb. of water evaporated per lb. of coal fired		Percent increase in boiler efficiency	
	M.M. front end, annular nozzle*	L.E. Corp. front end four-jet nozzle [‡]	M.M. front end, annular nozzle*	L.E. Corp. front end four-jet nozzle [‡]	M.M. front end, annular nozzle*	L.E. Corp. front end four-jet nozzle [‡]	L.E. Corp. front end compared with M.M. front end*	L.E. Corp. front end compared with M.M. front end*
7,000	41.2	42.8	37,312	38,761	5.33	5.54		3.9
8,000	45.7	47.2	41,387	42,746	5.17	5.34		3.3
9,000	49.9	51.6	45,191	46,731	5.02	5.19		3.4
10,000	53.7	56.0	48,632	50,715	4.86	5.07		4.3
11,000	57.6	60.5	52,164	54,791	4.74	4.98		5.1
12,000	61.1	64.8	55,334	58,685	4.61	4.89		6.1
13,000	64.4	69.0	58,333	62,488	4.49	4.81		7.1
14,000	67.4	72.6	61,039	65,749	4.36	4.70		7.8
15,000	69.8	75.5	63,213	68,375	4.21	4.56		8.3
16,000	71.7	78.3	64,934	70,911	4.06	4.43		9.1
17,000	72.8	80.8	65,930	73,175	3.88	4.30		10.8
18,000	....	83.3	....	75,439	....	4.19		....

*Master Mechanics' front end with annular-ported nozzle having 7½-in. plate, standard stack and standard exhaust stand. Stack 24 in. dia. at choke; total length with extension, 50½ in.; 7½-in. plate on nozzle; nominal area, 43.4 sq. in.; actual area 38.5 sq. in.; nozzle tip to bottom of front end, 39½ in.; nozzle tip to stack flare, 18½ in.; 15-per-cent air-opening grates; no secondary air; original standard ash pan; 9-row brick arch.

†Economizer front end, four-jet exhaust nozzle with holes on 12-in. circle; 3½-in. and 3¼-in. holes, giving nozzle areas of 47.2 sq. in. and 44.2 sq. in.; large stack, 25 in. dia. at choke and 30 in. dia. at top; nozzle plate to bottom of front end, 21 in.; 11-row brick arch; secondary air over fire; 20-per-cent air-opening grates; ash pan lowered.

‡Based on 50 deg. F. tank water and temperature rise due to exhaust steam from exhaust-steam injector, 80 deg. F.; 1104.2 B.t.u. required to make one pound of steam.

which may be compared with 14.19 cents plus 7.31 cents or a total of 21.50 cents a mile for the 7000 class locomotives.

Locomotives Designed for High Speed Operation

The new 800 class locomotives are designed through-out for a maximum operating speed of 90 miles an hour, and on test runs have operated satisfactorily at speeds in excess of 100 miles an hour. This high-speed capacity is necessary to make the high average speeds called for by fast train schedules. An actual check of Challenger train speeds shows nine points on the 362.6 mile run westbound between Grand Island, Neb., and Cheyenne at which running speeds exceed 75 miles an hour and reach a maximum of 82.9 miles an hour for distances from 2 to 7.6 miles. The average schedule speed for this entire run is 48.8 miles an hour.

Similarly, eastbound between Cheyenne and North Platte, there are ten points at which the between-station running speeds exceed 75 miles an hour and reach a maximum of 82.9 miles an hour for distances of 2.7 to 7.6 miles. On this entire run of 225.4 miles, the average schedule speed is 58.0 miles an hour. The highest aver-

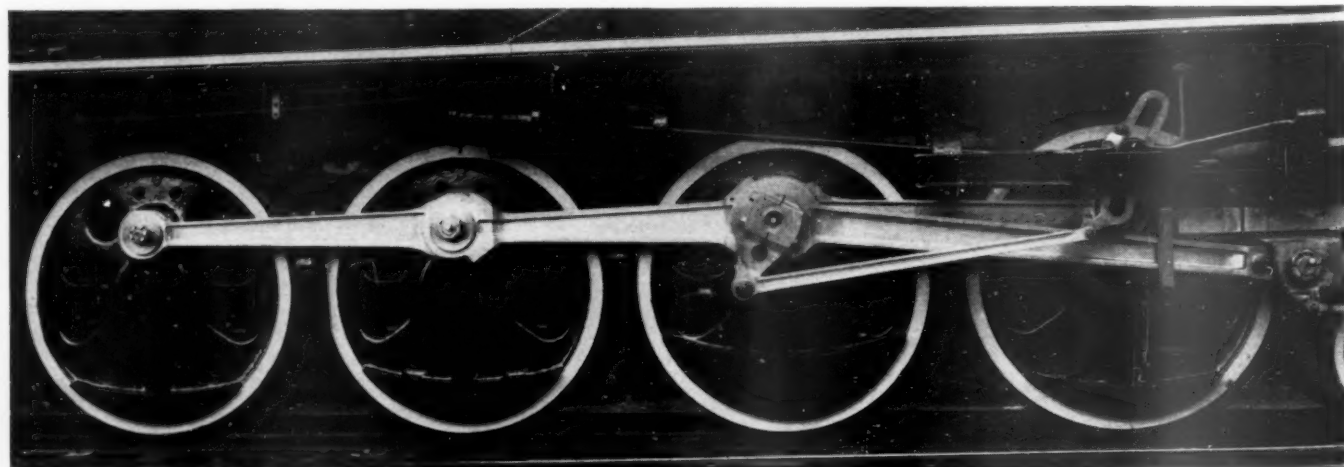
age actual speed was 91 miles an hour.

The new U. P. class-800 locomotive develops a tractive force of 63,600 lb. in starting. The total engine weight of 465,000 lb. is apportioned as follows: 81,200 lb. on engine trucks, 270,000 lb. on drivers, and 113,800 lb. on trailing trucks. Carrying 25 tons of coal and 20,000 gallons of water, the tender weighs 366,500 lb. The cylinders are 24½ in. by 32 in. and the driving wheels 77 in. in diameter.

The overall length of engine and tender is 110 ft. 7⅞ in. The working pressure of the boiler is 300 lb. per sq. in. The combined heating surface is 6,070 sq. ft. and the grate area of the firebox is 100.2 sq. ft.

The frames and running gear were specially designed to insure low cost maintenance. The frame is of the engine bed type, a one-piece casting which includes cylinders, back cylinder heads, main air reservoirs, air pump supports, guide supports and reverse gear bracket supports.

The articulated side-rod design, developed jointly by the Union Pacific and Alco engineers, is one of the outstanding features of the locomotive. The side rods have no knuckle joints on the front and back sections. The



The Driving Rods and Motion Work Are of Unique Construction

rear end of the front side rod fits between the jaws of the front end of the intermediate rod and both fit over the main crank pin. Similar construction is followed for the back side rods.

The outer ends of the front and back side rods and the back end of the main rod are of U-section to reduce weight. The axles, crank pins and rods were designed for the inertia forces present when drifting at operating speed of 90 miles an hour instead of for the conventional piston thrust.

Delta type. The trailer truck wheels are fitted with SKF roller bearing journal boxes of the outside type. The rear trailer wheels which are 45 in. in diameter have cast-steel spoke centers, with 3½-in. heat-treated tires, while the front wheels of 36 in. diameter are rolled steel, quenched and tempered.

Guides and crossheads are of multiple ledge design surfaced with pure tin. The crosshead wrist pin incorporates a new feature in collar design. The collar is of the sleeve type, having a tapered fit on the wrist pin

Table III—Horsepower, Fuel and Water Consumption Based on Average Water Rates and Average Boiler Efficiencies

Indicated horse- power	Lb. steam per i.h.p. hr.		Steam to locomotive cylinders, lb. per hr.		Total evaporation, lb. per hr.*		Lb. coal per hr.		Coal per i.h.p. hr.		Four-jet nozzle com- pared with annular nozzle		
	Annular nozzle, 7½-in. dia. plate	Four-jet nozzle, 3¾-in. dia. holes	Annular nozzle, 7½-in. dia. plate	Four-jet nozzle, 3¾-in. dia. holes	Annular nozzle, 7½-in. dia. plate	Four-jet nozzle, 3¾-in. dia. holes	Annular nozzle, 7½-in. dia. plate	Four-jet nozzle, 3¾-in. dia. holes	Annular nozzle, 7½-in. dia. plate	Four-jet nozzle, 3¾-in. dia. holes	Coal saved per hour	Per cent coal saving	
2,000	16.98	14.72	33,960	29,440	38,960	34,440	7,400	6,000	3.70	3.00	1,400	18.9	
2,200	16.35	14.50	35,970	31,900	40,970	36,900	7,900	6,600	3.59	3.00	1,300	16.5	
2,400	15.92	14.33	38,208	34,392	43,208	39,392	8,400	7,140	3.50	2.98	1,260	15.0	
2,600	15.64	14.20	40,664	36,920	45,664	41,920	9,000	7,750	3.46	2.98	1,250	13.9	
2,800	15.46	14.10	43,288	39,480	48,288	44,480	9,700	8,400	3.46	3.00	1,300	13.4	
3,000	15.40	14.06	46,200	42,180	51,200	47,180	10,500	9,050	3.50	3.02	1,450	13.8	
3,200	15.43	14.06	49,376	44,992	54,376	49,992	11,500	9,750	3.59	3.05	1,750	15.2	
3,400	15.57	14.10	52,938	47,940	57,938	52,940	12,700	10,500	3.74	3.09	2,200	17.3	
3,600	15.81	14.21	56,916	51,156	61,916	56,156	14,400	11,300	4.00	3.14	3,100	21.5	
3,800	14.35	54,530	59,530	12,250	3.22
4,000	14.51	59,040	63,040	13,200	3.30
4,200	14.70	61,740	66,740	14,400	3.43
4,400	14.92	65,648	70,648	15,800	3.59
4,600	15.31	70,426	75,426	18,000	3.91
4,800	15.44	74,112	79,112	20,500	4.27

*5,000 lb. of steam per hour to auxiliaries.

The driving wheels are the Bopok type. The main drivers have counterbalances with a primary balance for revolving and reciprocating weights, centrally located opposite the crank pin and with an independent secondary balance set at right angles to the primary balance. The over-balance is 38 per cent of the total reciprocating weight, divided between the four pairs of drivers.

These locomotives are the first on the Union Pacific purchased with roller bearings on all axles. The driving boxes are fitted with Timken roller bearings and one-piece Timken bearing housings. The first and third drivers are equipped with Alco lateral cushioning devices.

The four-wheel engine trucks are of Alco design and feature inside SKF roller bearings, rolled steel wheels, a vertical dampening device, and lateral resistance of the geared roller type.

The trailer truck is of the Commonwealth four-wheel

and a taper fit in the crosshead plate insuring a tight fit on wrist pin and in crosshead.

The pistons are of lightweight Z-section rolled steel, fitted with bronze tee sectional packing, and valves are of light-weight design equipped with gun iron sectional packing rings.

Each driving box is fitted with a Franklin compensated snubber and lubricated on both pedestal faces and on each side of the wedge by mechanical force-feed lubricator.

High Mileage Between Tire Turnings

The mileage between tire turnings and tire condition just prior to turning is an all-around check on design efficiency. The average tire mileage up to the first turning was 104,000 miles with a maximum of 133,000

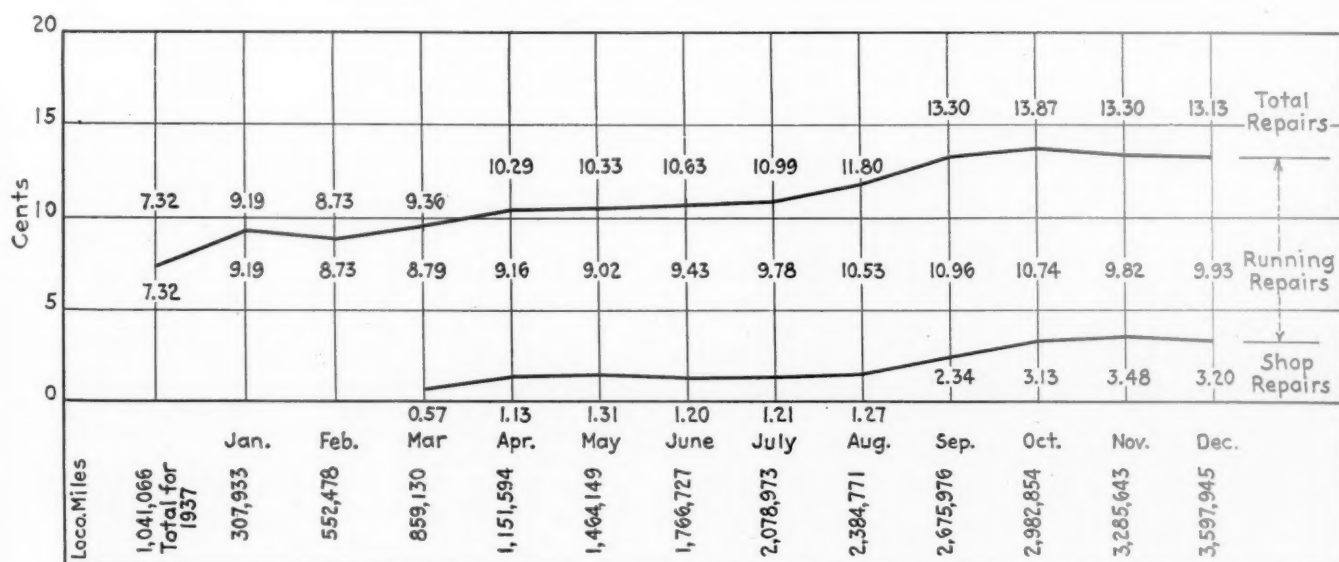


Fig. 1—Cumulative Mileage and Repair Costs (Cents per Mile) Made by Twenty 800-Class Locomotives During 1938

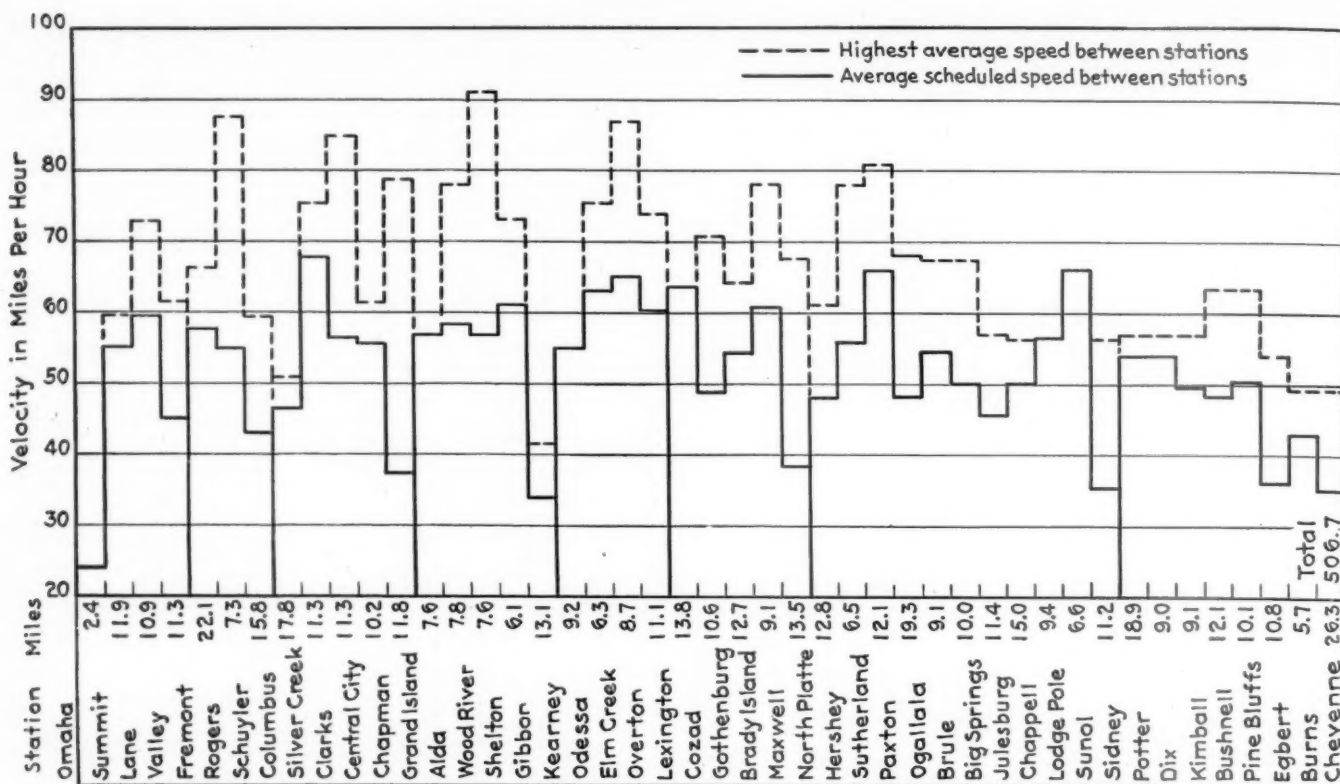


Fig. 2—Station-to-Station Speed Averages of Challenger Trains Westbound, Month of November, 1938

miles. Prior to turning, all tires were found to be wearing evenly and uniformly round and of the same diameter. There has been no evidence of quarter slip. These new locomotives have made a maximum of 18,200 miles per month.

As these were the first locomotives operating on the Union Pacific with 300 lb. per sq. in. boiler pressure, a close check was kept on boiler condition. Boiler maintenance problems to date have presented no difficulties. Enginehouse and shop forces are familiar with the operating and maintenance characteristics of these high-pressure boilers and no trouble or undue expense has been experienced.

Greater Capacity Secured by Improved Drafting

The 800 class locomotives, as delivered, were equipped with the Master Mechanics' front ends and annular

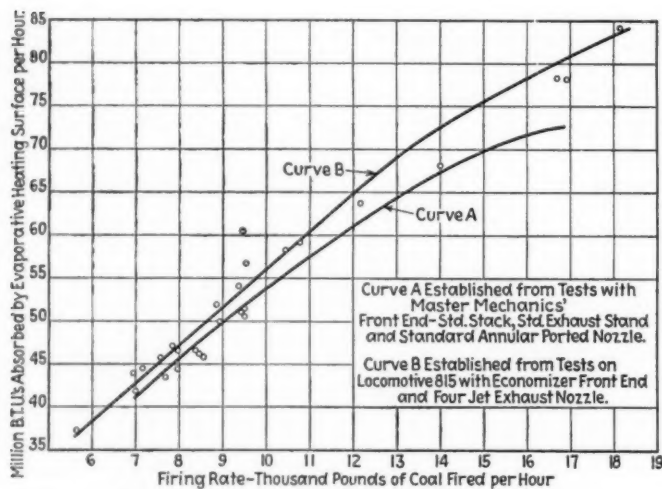


Fig. 3—Relation Between Firing Rate and Boiler Heat-Absorption Rate—800-Class Locomotives

ported nozzles. The possibilities for increased power and efficiency were explored in conjunction with the test of a baffle-type front end developed by Locomotive Economizer Corporation, which imposes no dimensional limitations upon the exhaust nozzle stand, allowing full design advantage to be taken of low stands.

The Economizer front end consists of a box with vertical sides, a rounded back and roof. The front of the box is built-up of louvers. Secondary louvers are also located in the sides of the box. All gases, before entering the stack, must pass through the louvers which serve as cinder breakers. This front end is in no way attached to the nozzle stand or tip and therefore no limitations are imposed upon the height of the stand.

Road tests were made of 27 different drafting arrangements and it was developed that the best combination consisted of Economizer front end used in conjunction with a large stack, a four-hole nozzle, 11-row brick arch, secondary air openings over the fire, 20 per cent air-opening grates and lower ash pan. The performance of a locomotive so equipped compared with the same locomotive equipped with the Master Mechanics' front end, annular ported nozzle, nine-row brick arch, 15-per-cent air-opening grates, standard stack and standard ash pan as delivered by the builder showed the following:

Gain of 3.3 to 10.8 per cent in boiler efficiency, as shown in Figs. 3 and 4 and Table II.

Maximum evaporation rate increased from 66,000 to 78,000 lb. of water per hour, as shown in Fig. 4.

Gain in cylinder efficiency by decreasing average water rates from 8.7 to 13.3 per cent, as shown in Fig. 5 and Table III.

Increase in maximum power from 3,600 to 4,870 indicated horsepower. (Tractive force and horsepower curves for the 800-class locomotives are given in Fig. 6).

Fuel saving for the same horsepower of 13.4 to 21.5 per cent, as shown in Table III.

The increase in boiler efficiency was due to the sec-

(Continued on page 420)

Samuel T. Bledsoe

Passes

Entered service of Atchison,
Topeka & Santa Fe in 1895—
Became President in 1933



S. T. Bledsoe

SAMUEL THOMAS BLEDSOE, president of the Atchison, Topeka & Santa Fe, died in Chicago on March 8. He had been confined to bed with arthritis of the spine since the first of the year and died as the result of an internal hemorrhage.

Mr. Bledsoe entered the employ of the Atchison, Topeka & Santa Fe in 1895 as a local attorney at Ardmore, Indian Territory, and was elected president of the road in May, 1933. During his administration the Santa Fe maintained its position as one of the strongest and most progressive railroads of the country. On December 31, 1937, its corporate surplus totaled \$291,264,385, while its operating revenues for 1938 totaled \$154,323,227. Especially outstanding has been the policy pursued in maintaining the property, expenditures for maintenance of way for the system during the years 1933-37 averaging \$1,529 per mile of line and those for the maintenance of equipment \$2,505 per mile.

Of special interest has been the Santa Fe's program for the improvement and extension of its service during the last four years, one result of which is the 15 ultra-modern, lightweight streamlined trains that the Santa Fe is now operating, the largest fleet of its kind in the world. In addition to improving its Chicago-Los Angeles, Cal., service by the inauguration of 39¾ hr. service and the introduction of new equipment, it shortened its schedules and added new trains between Chicago and Kansas City, between Los Angeles and San Diego and between Bakersfield and Oakland. To make these schedules possible, with maximum comfort to passengers, extensive programs of curve reduction were undertaken in 1937 on the Chicago-Los Angeles and Chicago-Texas lines, looking to unrestricted passenger operation at speeds up to 90 miles per hour. In the prosecution of this program, more than 500 curves have been reduced to 1 deg. 30 min. or lower to date.

It was during Mr. Bledsoe's presidency also that the Santa Fe became interested in bus and truck operation.

In 1935, it acquired a controlling interest in the Southern Kansas Stage Lines Company which operated, directly or through affiliates, a motor transport system providing passenger and freight service between Chicago and California and intermediate points, principally in the territory served by the Santa Fe. In addition, it acquired the Santa Fe Trail Stages and subsidiary motor coach companies, such as the Cardinal Stages and the Blue Coach Motor Lines, the Central Arizona Transportation Lines and the Arizona Utah Stages, with the result that the Santa Fe Trail Stages now operate between Chicago and the Pacific Coast with a network of lines in Kansas, Oklahoma and Arkansas and other lines serving points as far south as Dallas, Tex.

Mr. Bledsoe's death ends a career which began with the teaching of school in Clinton County, Ky., in 1885. He was born in Clinton County on May 12, 1868, and received his education in the public schools in Clinton County, a private school at Jamestown, Russell County, the Southern Normal School and Business College at Bowling Green, the University of Texas Law School and Washington and Jefferson College. He taught school from 1885 to 1889, and began the practice of law at Ardmore, Indian Territory in 1890. From 1908 to 1910 he practiced at Guthrie, and from 1910 to 1914, at Oklahoma City, Okla.

He entered railway service as a local attorney for the Santa Fe at Ardmore in 1895, and became attorney for Indian Territory in 1907. From July, 1908 to July, 1912, he was a member of the firm of Cottingham and Bledsoe, solicitors for the Santa Fe System in Oklahoma. In July, 1912, he was appointed general attorney of the Santa Fe at Oklahoma City, retaining his partnership in the law firm. On January 5, 1915, he was made assistant general solicitor of the Santa Fe lines, with headquarters in Chicago, and on April 12, 1918, was appointed general counsel and elected a member of the board of directors. He was elected chairman of the

executive committee on December 2, 1931, and on May 2, 1933, president and chairman of the executive committee for the Atchison, Topeka & Santa Fe Railway Company, and shortly thereafter, president of the other Atchison system companies.

While president of the Santa Fe, Mr. Bledsoe took an active part in many other enterprises. He was a director of the Association of American Railroads, the Railway Express Agency and the Chamber of Commerce of the United States, in which organization he had been especially active as chairman of its transportation committee.

Intensive Locomotive Use Pays Union Pacific

(Continued from page 418)

ondary air admitted over the fire, the longer arch, the larger air openings in grates and the increased air opening in the ash pan. The other gains listed were the result of the use of the four-jet nozzle and large stack,

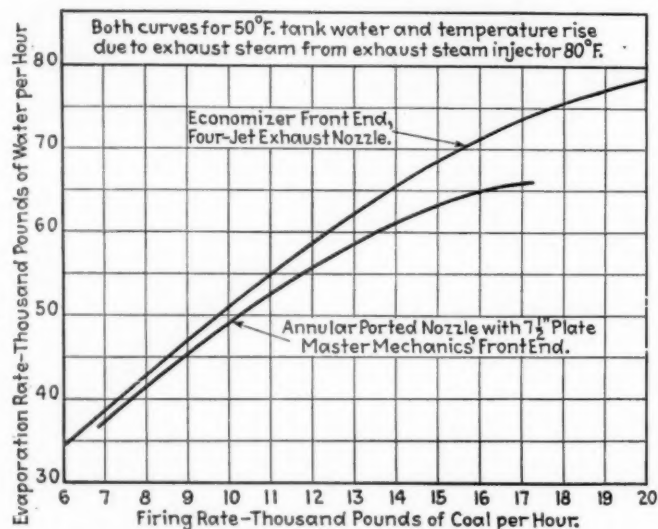


Fig. 4—Relation Between Firing and Evaporation Rates, 800-Class Locomotives

in conjunction with the Economizer front end arrangement.

In determining boiler performance, the curve which was established for the Master Mechanics' front end

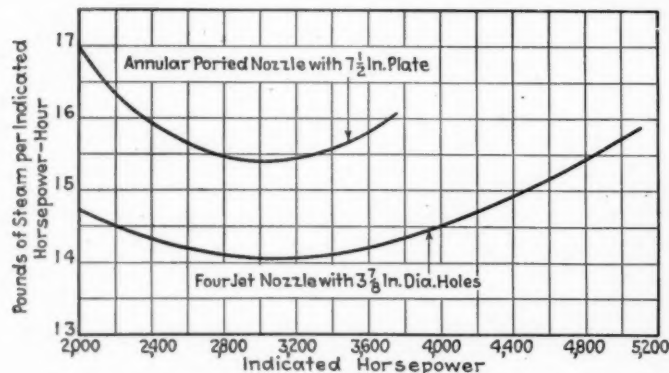


Fig. 5—Relation Between Average Water Rates and Indicated Horsepower—800-Class Locomotives

showing the relation between the firing rate and the boiler heat absorption rate, was used as a basis. This curve shows that a definite relation exists between the firing rate and boiler heat absorption rate. The effect of

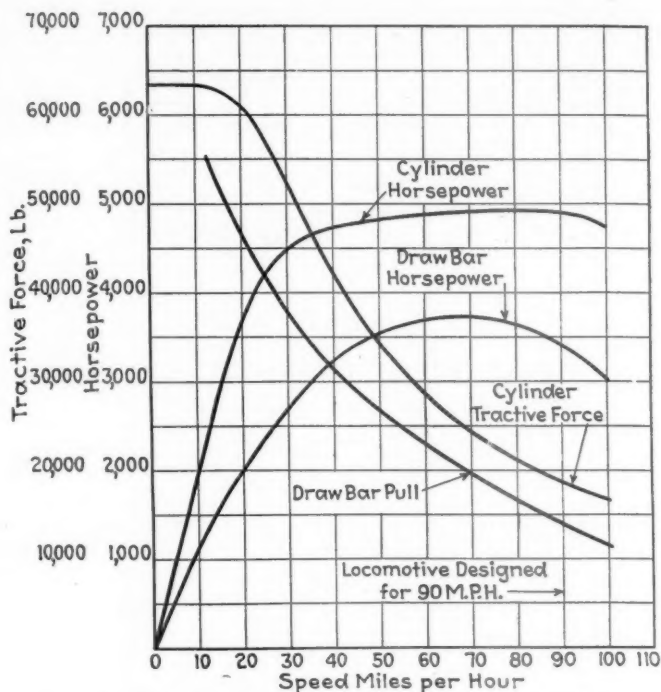


Fig. 6—Tractive Force and Horsepower Curves for Union Pacific 800-Class Locomotives

any experimental changes upon boiler performance can be determined by plotting the firing rate against the boiler heat absorption rate and comparing it with the curve. Cylinder performance was determined by the heat-drop method.

Conclusion

During the past few years, public attention, as well as the critical interest of railroad officers, has been centered on problems of motive power requirements and performance. Over 1½ years operation of the Union Pacific's 20 new 4-8-4 type steam locomotives has shown what a well developed design, plus modern available materials can do to meet present-day requirements for motive power capacity, speed and continuity of operation.

* * *



This Buffet Compartment of the Victorian Government Railways, Australia, is 52 ft. Long and Completely Air-Conditioned. The Car Itself is 75 ft. Long

Committee-of-Six Bill Introduced

Lea offers measure in House as expressions of doubt that any general transport legislation will be enacted at this session are heard on Capitol Hill

WASHINGTON, D. C.

EXPRESSIONS of doubt that any general transport legislation would be enacted at the present session of Congress were heard on Washington's Capitol Hill this week as the House committee on interstate and foreign commerce resumed hearing on Chairman Lea's omnibus bill after last week's interlude of testimony on interterritorial freight rates. Meanwhile, however, Chairman Lea on March 8 introduced in the House the committee-of-six's proposed rewrite of the Interstate Commerce Act—it is H. R. 4862; while Chairman Wheeler of the Senate committee on interstate commerce was expected shortly to offer in the Senate a somewhat less comprehensive bill which would propose, among other things, the regulation of all transport agencies by the Interstate Commerce Commission and a board to study the transportation situation.

The day before he introduced the committee-of-six bill, Chairman Lea put in another (H. R. 4827) which would place freight forwarders under I. C. C. regulation. The chairman's purpose in this connection is understood to have been one of putting the forwarding question before his committee so that interested parties might give their views as to whether the matter should be dealt with in any general transport legislation which may be enacted at this time. The committee-of-six bill as introduced by Mr. Lea is the rewrite of the Interstate Commerce Act embodying the changes, additions and omissions discussed by Judge R. V. Fletcher, vice-president and general counsel of the Association of American Railroads, in his testimony at the Lea-bill hearings reported in recent issues of *Railway Age*. The bill was printed by the committee on interstate and foreign commerce and made public last week; but several corrections and technical changes were made in shaping the measure for introduction in the House.

Misgivings Being Expressed

With respect to the above-mentioned expressions of misgivings as to the prospects for broad-gage transport legislation at this session, Congressional leaders are privately expressing the opinion that the pending proposals are so controversial as to preclude the likelihood of early agreement on a satisfactory measure. It is pointed out that the House committee hearings have been going on since January 28, while the Senate committee on interstate commerce has yet to get started. Thus the suggestion has been advanced that agreement might be reached on such matters as repeal of land grant rates, liberalization of Reconstruction Finance Corporation loans or other measures which might be considered to offer prospects for immediate aid to the carriers.

An expression along the foregoing lines came this week from a minority member of the House committee—Representative Halleck, Republican of Indiana, who has been a regular attendant at the hearings where he has taken an active part in questioning witnesses. Mr. Halleck said that he had told Chairman Lea that the "time is too short" to hope that a general transportation bill

could be approved. "I have suggested," he added, "that we ought to concentrate only on those things which might help to stabilize the railroad industry and tide them over through this emergency." However, Chairman Lea appears to remain hopeful. At the March 8 session he spoke of the need for expediting the hearings as much as possible because it is "very important to get legislation at this session."

Also on the side of getting action at the present session is railway labor's disposition to "go to town" for the committee-of-six recommendations; but against this must be set the opposition of various other powerful interests which were not in the picture when railway labor "went to town" on recent occasions with its Railway Unemployment Insurance Act and the Signal Inspection Act. It is understood that the railroads are making some effort to arrive at a compromise which will meet objections of the National Industrial Traffic League; but there is the report that some railroads object to provisions of the committee-of-six bill relating to financial reorganizations and to its failure to deal with the Railway Labor Act as recommended in the original A. A. R. program. With respect to the attitude of the individual railroads it is admitted that some do not care for the reorganization provisions, but it is claimed in informed quarters that there is no disposition to criticize the management members of the committee-of-six for that committee's failure to deal with the Railway Labor Act. In this connection it is pointed out that the committee-of-six report suggested that such matters should be worked out through collective bargaining; but it nevertheless went on to say that "if no solution can be found they may be urged upon the government or otherwise handled as the circumstances may appear to warrant." This is interpreted to mean that railroads interested in revision of the Railway Labor Act are free to work for such revision outside the committee-of-six bill.

Filibuster Threat

Another hazard which the committee-of-six bill may encounter is the threat of Southern and Western senators and representatives to filibuster against any general transport legislation which does not include provisions designed to equalize interterritorial freight rates, i. e., unless some satisfactory "equalizing" measure is passed first. At a Congressional conference on the matter this week Senator Hill, Democrat of Alabama, said that "as long as there is unlimited debate in the Senate, there'll be no general transportation legislation until this matter (territorial rate equalization) is disposed of." Finally there is the failure of President Roosevelt thus far to make any special recommendation to Congress with respect to the report of his committee-of-six. The only definite reference to the Administration's position at the House hearings came in the testimony of George M. Harrison, chairman of the Railway Labor Executives' Association, who said that the President had asked him and Carl R. Gray, vice-chairman of the Union Pacific,

to go before the committee in support of the committee-of-six recommendations.

Meanwhile, as noted at the outset the House committee has proceeded with its hearings on the Lea omnibus bill (H. R. 2531), giving this week's sessions over to presentations on behalf of water transportation.

The first representative of the waterway interests was C. E. Childe, chairman of the Mississippi Valley Association's traffic committee, who said that Association favors the development of all transport agencies "to the fullest extent that they will serve the public interest." Also, it favors the elimination of "waste" in transportation and the removal of restrictive regulation; but it opposes repeal of the long-and-short-haul clause, regulation of port-to-port water rates and the collection of tolls for the use of inland waterways. Competition, Mr. Childe said, regulates water rates adequately while there should be no tolls because the waterways are by tradition "free highways."

M. V. A., Mr. Childe went on, opposes revision of the Interstate Commerce Act's rule of rate-making, but it would not object to the elimination of the rule. It does not think there should be any change in present practice with respect to the allocation of costs of rebuilding railroad bridges altered in connection with waterway improvements. Representative Wadsworth, Republican of New York, asked why the railroads should be saddled with such costs; and the witness replied that, as he understands the present situation, the War Department does not charge against railroads bridge changes which the carriers could not foresee would be necessary when they built the original structure.

Water Transport Needs Subsidy to Live

Representative Martin, Democrat of Colorado, asked how much the government was "in the red" as a result of the Federal Barge Line's operations. Mr. Childe replied that the line was not in the red; although he conceded that there may be some dispute about its "book-keeping," he insisted that there is no question about its "profit," and the "surplus" which it is accumulating. Mr. Martin went on to observe that there wouldn't be any water transportation if the government didn't subsidize it; and the witness agreed that the water carriers are subsidized if the maintenance of channels, etc., be called a subsidy. He added that water "is inherently the cheapest form of transportation," this being "true" in part because the operating costs are low and in part because the government provides the channels. Mr. Childe has heard from railroad sources the argument that it is "all right" for the government to provide harbors, channels and other aids to navigation on the high seas and the Great Lakes, but that it is "all wrong" to do the same things for inland waterway transportation.

Representative Martin wondered if the government would ever get back the money spent on the Missouri river; and the witness assured him that the outlay would be returned in benefits to the interior country "a hundredfold—a thousandfold." "That'll be a lot of money," Mr. Martin said. Later the Coloradan said that he had seen a lot of the Missouri since he was "able to walk," and he has never been able to visualize its being of any value for transportation. When Mr. Childe suggested that his questioner had seen an "unfinished" river, Mr. Martin came back with: "Nature's going to keep it unfinished." The witness, however, had more confidence in the "engineers" who are proceeding with improvements which he anticipates will bring forth "low cost" transportation.

Meanwhile Mr. Childe had condemned the Lea bill's

proposal to place inland waterway rates under I. C. C. jurisdiction, claiming that such regulation would not help the railroads in their efforts to build their own traffic, although it might help them to "kill off the competition." With that the witness entered upon an extended discussion of the uneven distribution of population and manufacturing as he set out to give the committee some "economic facts which we think are basic in any consideration of the transportation problem."

This discussion cited the concentration of population along the Atlantic seaboard, and Representative Hinshaw, Republican of California, was "amazed" to find that population and manufacturing had not followed the inland water routes. Mr. Childe replied that such routes had just begun to develop, adding that they have had "considerable to do" with holding for the interior industry which might otherwise have moved. Mr. Hinshaw observed that the inland waterways were here before the railroads, but the witness pointed out that the former were not "improved" until recent years. Also, he has great hope for an extension of the inland waterways' influence through the development of joint rail-water rates.

When Mr. Hinshaw asked why the government should not provide railroads with their rights-of-way, Mr. Childe replied that the railroads are private enterprises which retain exclusive use of their facilities whereas water transportation "the world over is considered an operation on public highways."

Everything but Boats "Free" to Water Line

After an effort to obtain from the witness an explanation of how joint rail-water rates would help intermountain territory, Representative Martin went on to say that he was won over to the support of long-and-short-haul-clause repeal because he saw the inability of the railroads to compete with low water rates that are in effect anyway, regardless of what the railroads do. "All a man needs is a boat and he's in the water transportation business; all he needs is a truck or a bus and he's in the motor transportation business—everything else is furnished him free," Mr. Martin added. As to the uneven distribution of population, he went on to observe that if it weren't for the railroads there would be nobody in the interior. The Coloradan was prepared to admit that the railroads can't meet water rates as a general proposition, but he thought they might meet them if it required any capital investment to be in the water transportation business.

After giving way at the opening of the March 8 session for a brief statement from Fred Brenckman, Washington representative of the National Grange, Mr. Childe resumed his testimony and addressed himself to what he called the railroad argument to the effect that they will be destroyed and the country will suffer if other transport agencies are not more strictly regulated. Mr. Childe and his Mississippi Valley Association are "for the railroads" but they do take issue with the carriers on the proposition that the government must "penalize" commerce and other transport agencies "in order to make the railroads prosperous."

Grange a "Friend of Railroads;" But—

The National Grange is also "a friend of the railroads," Mr. Brenckman said; but agriculture "also has a vital stake in water and motor transportation." Thus the Grange does not believe that "the best interests of the country as a whole will be served by imposing uniform regulations on all modes of transportation." As

a broad general proposition it thinks Congress might carefully consider relaxing some railroad regulation, and it is "in hearty sympathy with the idea that proper steps should be taken at this session of Congress to rehabilitate the railroads." The Grange further suggests relief from the cost of eliminating grade crossings; but it opposes repeal of the long-and-short-haul clause.

Representative Culkin, Republican of New York, assailed the Lea bill in a House speech last week, calling the measure a proposal which "will destroy waterways and trucks and, in the long run, the very railroads themselves." The speech occupies two and one-half pages in the Congressional Record, and is set off with such sub-heads as: Railroads Asking Monopoly; Greatest Lobby in History; Dividends on Inflated Values; Dividends in Depression Years; I. C. C. Without National Vision; Savings on Water Transportation. Mr. Culkin, so he said in closing, was speaking "for the economic freedom of the people of America" when he urged the House "to defeat the Lea bill if it comes to the floor."

National Trailways Grows

ON April 1, 1936, the National Trailways was formed by the Burlington and the Missouri Pacific transportation companies, the Santa Fe Trail Stages and others, as a national bus system, the various companies to be individually operated but closely allied in the matter of through rates and routes, joint stations, solicitation and advertising. In less than three years, this organization has grown to be truly national in scope, 20 new bus companies having been added to its membership. As at present constituted, the National Trailways consists of the following companies, many of which have railroad affiliations:

Rio Grande Trailways: (D. & R. G. W.) Operating between Denver and Pueblo and Salt Lake City, via Tennessee Pass, with many feeder schedules in central and western Colorado and Utah.

Burlington Trailways: (C. B. & Q.) Operating between Chicago and Los Angeles, via Omaha, Cheyenne and Salt Lake City; also between Salt Lake City and San Francisco; also between Chicago and Denver and between Denver and Billings, Mont., as well as numerous local schedules in the territory served by the parent railway.

Denver-Salt Lake-Pacific Trailways: (C. B. & Q.-D. & R. G. W.) Operating between Denver and Salt Lake City via Steamboat Springs, Colo.

Santa Fe Trailways: (A. T. & S. F.) Operating between Chicago, Los Angeles, San Francisco and San Diego; also between Kansas City and Texas; Chicago and Denver; Phoenix and Salt Lake City; Chicago and St. Louis; as well as many lines paralleling practically all the routes of the parent railway.

Missouri Pacific Trailways: (M. P.) Operating over routes paralleling practically all of the lines of the parent railway between St. Louis; Brownsville, Texas; Pueblo, Colo.; Omaha, Nebr.; and New Orleans, La.

Denver-Colorado Springs-Pueblo Trailways: (D. & R. G. W.-M. P.-C. S.) Operating between Denver, Colo., and Trinidad.

Blue Way Trailways: Operating between New York and Boston and between New York and various central Connecticut and Massachusetts points.

Virginia Stage Lines: Operating between Washington, D. C., and northern North Carolina points, with two main line routes used by New York-Florida buses.

Smoky Mountain Stages: Operating in western North Carolina and portions of Georgia and South Carolina, serving as part of through New York-Florida and New York-New Orleans routes.

Canadian American Trailways: Operating through Ontario, between Detroit, Mich., and Buffalo, N. Y.

Adirondack Trailways: Operating between New York and various resort centers in the Adirondack and Catskill Mountains.

Safeway Trailways: Operating between New York, Washington, Cleveland, Detroit and Chicago via several routes, including those of its subsidiary companies, the Safeway Lines and the Neven Midland Lines.

Martz Trailways: Operating between New York, Philadelphia, Scranton and Wilkes-Barre.

Yankee Trailways: Operating between Chicago and Indianapolis.

Southeastern Trailways: Operating between Indianapolis and Cincinnati.

Central Trailways: Operating between Milwaukee, Wis., and Peoria, Ill.

A. W. Shepherd Bus Lines: Operating between Springfield, Mo., and Fayetteville, Ark.

Southwestern Trailways: Operating between Oklahoma City, Okla., and Altus.

Jacksonville Trailways: Operating between Peoria, Ill., and St. Louis and between Springfield, Ill., and Hannibal, Mo.

M. K. & O. Trailways: Operating between St. Louis and Oklahoma City, with many branches in Oklahoma.

Dixie Trailways: Operating numerous lines radiating from Dallas, Texas, including parts of transcontinental runs.

Sunshine Trailways: Operating between Dallas, Texas, and Shreveport, La.

Panhandle Trailways: Operating in the Texas Panhandle and in Oklahoma and Kansas.

Federal Grade Crossing Program Moves Forward

(Continued from page 411)

lated that awards should be made on the basis that results in the lowest cost for the material as a whole.

Very little information is available showing how the various states have established the priority of grade crossings for protection, but in one state at least (Illinois) a comprehensive formula giving consideration to all factors bearing on the question has been utilized for this purpose. This formula was developed for use in expending a sum of \$500,000 that was made available for crossing protection from funds allotted to the state under one of the federal acts. Out of a total of 700 crossings that were chosen for investigation, 264 were selected for the installation of signals, using the formula as a guide. Moreover, a total of 420 additional crossings were protected by an improved type of cross-buck sign embodying button-type reflectors.

From the foregoing discussion it is apparent that, speaking for the country as a whole, the federal grade crossing program is making satisfactory progress. But what is more important from the viewpoint of the railroads it is now evident that the original federal program comprised only an entering wedge for a more enduring and systematic attack on the grade crossing problem, with the financial burden imposed on the carriers being limited to an amount consistent with a fair distribution of the costs.

New and Improved Products



A View of a Part of the International Amphitheatre, Chicago, Where a Large Exhibit of Equipment and Materials of Special Interest to Engineering and Maintenance of Way Officers Will Be Held on March 13-16

New Dearborn Concentrometer

A NEW portable device, weighing less than eight pounds, is being marketed by the Dearborn Chemical Company, Chicago, for making quick and accurate determinations of boiler water concentrations. The new device, known as the Concentrometer, is an electrical instrument which effects its measurements by the conductivity method. For its operation, it can be plugged into any source of alternating current.

In the use of the instrument, a small sample of the boiler water to be tested is first poured into the test cup provided, and then a thermometer and two electrodes are immersed in the water sample. Then, when a scale selector switch on the instrument is turned to the temperature indicated on the thermometer, the meter provided can be read directly in grains per gallon.

The Concentrometer has an analysis range from 10 to 1,000 grains per gallon, and the measurements are said to be accurate to plus or minus five per cent over its entire range. Because of its small size and light weight, it can be carried readily from place to place.

Coaling Station of Low Alloy Steel

A NEW and interesting example of the use of low alloy, high strength steels is a 125-ton, all-welded, low alloy steel coaling station at Easton, Pa., which has recently been constructed and in which Mayari R, a product of the Bethlehem Steel Company, Bethlehem, Pa., was used. Although the new chute was built in a lighter design than formerly used, it is expected to have considerably longer life expectancy because of the

high strength, corrosion-resisting and abrasion-resisting properties of this steel.

Mayari R is a low alloy steel containing chromium, nickel and copper, from 0.08 to 0.20 per cent of carbon and between 0.50 and 1.00 per cent manganese. In plate form it has a minimum yield point of 50,000 to 55,000 lb. per sq. in. and a minimum tensile strength of 65,000



View of the 125-ton Coaling Station at Easton, Pa., Constructed of Low Alloy Steel

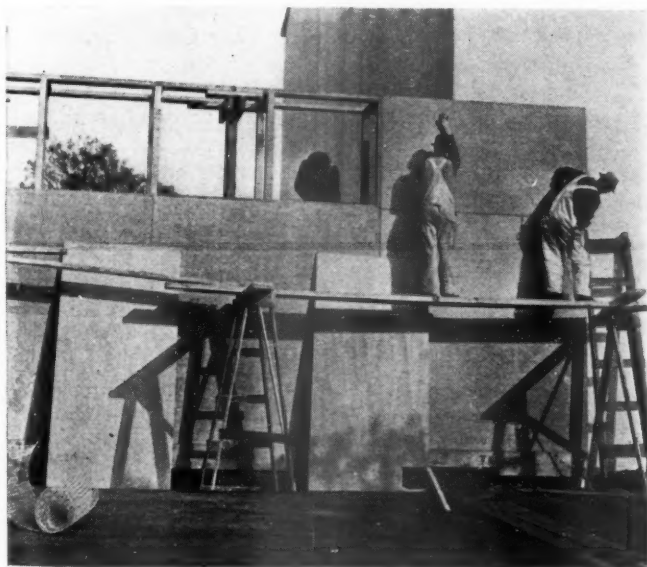
to 75,000 lb. per sq. in. It is said to have exceptional resistance to atmospheric corrosion, amounting to about six times that of mild carbon steel and also a considerably higher resistance to abrasion than ordinary steel. However, in the construction of the coal chute, parts

subject to extreme abrasion, such as gates, aprons, chutes and buckets, were made of Bethlehem No. 235 abrasion-resisting steel.

Other applications of Mayari R in the railway field where high corrosion resistance, reduced weight and resistance to abrasion are desirable include blast, ballast and deck plates for bridges; railings; stacks and breechings; partitions; and roofs, skylights and sash.

Waterproof Fir Plywood for Building Exteriors

DOUGLAS fir plywood, widely used for sheathing, concrete forms and various types of sheeting, is now being produced in a special grade for exterior use, such as building siding, or wherever a permanently waterproof material is required. It is said that this grade, designated EXT-DFPA, will retain its



The Exterior Grade Plywood Is Said to Be Unaffected by Extreme Moisture Conditions

original form and strength when alternately wet and dry and otherwise subjected to the elements over an indefinite period of time.

The new waterproof grade, like the other grades of plywood, is manufactured from selected veneer sheets, bonded together in cross laminations under hydraulic pressure, but, whereas the other grades employ water-resisting glues in the bonding process, the exterior grade employs the latest development in synthetic resin adhesives, which are said to be unaffected by moisture or water.

The exterior grade is manufactured under the U. S. Commercial Standard CS45-38 for Douglas fir plywood, which sets up rigid specifications as regards both materials and tests. The test for this grade requires that samples shall first be submerged in water at room temperature for a period of 48 hours and then dried for 8 hours at a temperature of approximately 145 deg. This is followed by two cycles of soaking for 16 hours and drying for 8 hours under similar conditions, and then further soaking for a period of 8 hours before testing in a special shear machine designed to determine the effectiveness of the bond between plies. In this machine

the samples are tested to failure, which must result without delamination.

The exterior grade of plywood is stocked in standard panels 4 ft. wide by 8 ft. long, but can be furnished in special lengths and widths on order. It is made in 3 to 7 plies, with thicknesses ranging from 1/4 in. to 1 3/4 in., and is furnished ordinarily with one face sanded for exterior exposure.

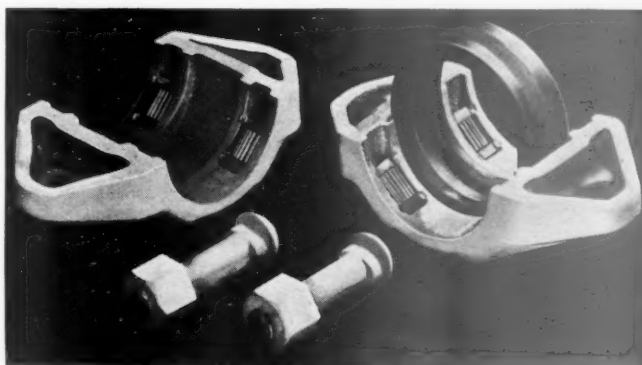
Through its cross lamination construction and firm bond between plies, the exterior grade plywood has great strength and stiffness and is said to be practically immune against expansion or shrinkage, regardless of temperature and moisture conditions. Like the other grades of plywood, it is readily worked and quickly applied, and in frame wall construction adds materially to the rigidity of the walls over any form of small unit siding.

New Pipe Coupling

A NEW type of pipe coupling, known as the G-B Rolagrip Pipe Coupling, which is applicable to the joining of straight plain-end and beveled-end pipe without special preparation of the pipe ends, is being marketed by the Gustin-Bacon Manufacturing Company, Kansas City, Mo. This coupling consists of two half-cylinder coupling sections made of copper-bearing malleable iron containing ribbed rollers, a special oil-proof rubber gasket and two bolts.

Rolagrip couplings are built to withstand 1,000 lb. working pressure, vacuum, and temperatures up to 175 deg. F. The high pressure type is tested to 2000 lb. pressure and is recommended for pressures up to 1000 lb. A low pressure type is available for pressures up to 500 lb. The couplings are made in sizes to accommodate pipe ranging in size from 2 to 10 in. inclusive and of corrosion-resistant materials.

In joining two lengths of pipe, the rubber ring gasket is first slipped over the end of one pipe; the two ends are then brought together and the gasket is slipped to cover the joint. Over this the two halves of the coupling are placed and bolted tightly. The pipe is firmly gripped by the ribbed rollers which imbed themselves in the faces of the pipe and recesses of the coupling housing. The rollers oppose separation of the pipe ends and yet give play to the normal forces of expansion and contraction



A Dismantled Coupling, Showing the Oil-Proof Rubber Gasket in Position

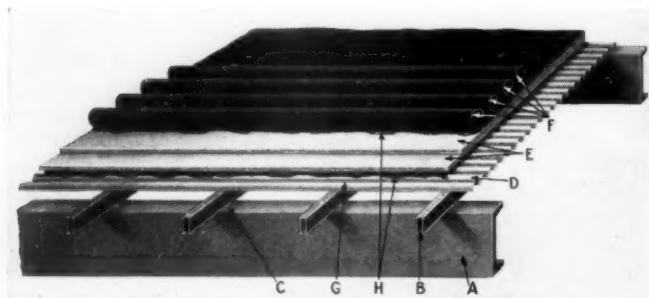
and allow an angular deflection of the pipe which averages about 5 deg. for the various sizes.

These couplings can be used on temporary as well as permanent pipe lines and for making line repairs by cut-

ting out a leak and quickly coupling the repair pipe in place. It is claimed that pipe line crews can install the 4-in. and 6-in. joints in one to one and one-half minutes per joint, and by the use of Rolagrip joints, plain end pipe or pipe of light wall gage can be used, with considerable savings as compared to standard line pipe with threaded connections. It is also claimed that the couplings have almost 100 per cent salvage or reclaimable value.

New Universal Steel Decks and Metal Sections

THE Ingot Iron Railway Products Co., Middletown, Ohio, has perfected a design of roof construction, which it has given the name of Universal Steel Deck, for the building of stronger, lighter, rigid type roofs. With this deck it has also developed a new Universal Metal Section which provides for nailing and is

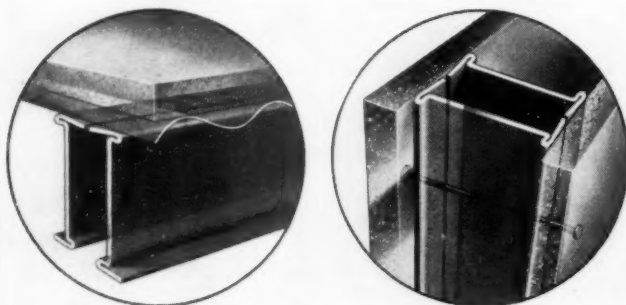


Sectional View of Complete Universal Steel Deck

A—purlins; B—Universal Metal Sections; C—weld; D—corrugated top sheet; E—insulating material; F—waterproofing; G—nails; H—asphalt

used in the construction of the Universal Steel Deck and for the construction of ceilings, sidewalls and partitions.

The Universal Steel Deck is built up with Universal Metal Sections, corrugated sheets, insulation and the roof coating. The metal sections, which are 2 in. deep by $1\frac{3}{8}$ in. wide, cold-formed from 16-gage Armco Ingot Iron or steel, are placed transversely across the purlins and welded in place. Standard corrugated top sheets, which are 24-gage and 30 in. by 120 in. in area, with corrugations $1\frac{1}{4}$ in. wide and $\frac{3}{8}$ in. deep, are placed on the metal sections, with the corrugations at right angles to the sections. A suitable insulation of a pressure-resisting type is placed on the corrugated sheets and the insulation and sheets are nailed to the metal sections, which are designed to provide for nailing.



Universal Metal Sections—Left—The Load Bearing Member in the Roof Deck—Right—The Type "B" Provides a Double-Nailing Feature for Partition and Wall Construction

The top roof coating of waterproofing and felts is then applied.

The extra rigidity of Universal Decks is provided by the combination of Universal Metal Sections and the corrugated top sheets installed at right angles to each other, which act to distribute any applied load uniformly. Spacing of purlins and metal sections can be varied, depending upon the amount of the load. The roof should be properly insulated to eliminate expansion and contraction of the steel, prevent the waterproofing felts from buckling or pulling apart, prevent condensation and make the building more comfortable.

When light continuous beams are required for ceilings, sidewalls and partitions, Universal Metal Sections can also be used for this construction. A Universal Section Type "B," similar to the roof section, is made which provides a double-nailing feature on both sides for such construction.

New Unit Heater

THE D. J. Murray Manufacturing Company, Wausau, Wis., has perfected a line of unit heaters, known as the Murco Unit Heaters, which are designed for the economical heating and proper circulation of air in rooms and offices of all sizes.

The new heater consists of a heating unit in a sheet metal case, at the rear of which is mounted an electric



One of the New Murco Unit Heaters

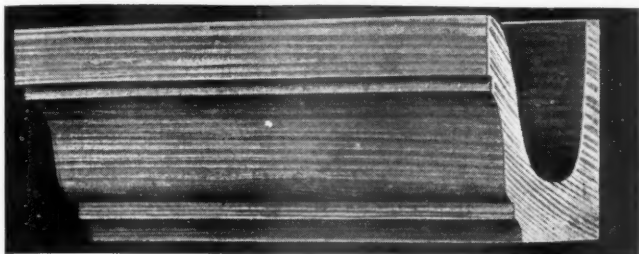
fan. The heating unit is made up of copper tubes with heavy side walls and with soldered copper fins which are expanded into high-test alloy cast iron headers. The copper tubes are expanded into the headers, instead of being welded or brazed, to eliminate strains.

The heating unit is mounted in a heavy gage streamlined sheet metal casing with spring supports, making it "full floating" and overcoming the difficulties of expansion and contraction. A series of adjustable vanes on the front of the casing direct the flow of air. The fan and electric motor are mounted on two steel supports at the rear of the casing and are of regular unit heater type and design. Simple and easily installed brackets are provided for hanging the heater.

The Murco Unit Heater is available in 25 models, providing circulation of heated air in quantities ranging from 430 cu. ft. up to 8,600 cu. ft. per minute and a B.t.u. output for 20,600 to 556,000 respectively.

"Shadowline" Fir Gutter

THE Long Fir Gutter Company, Cadiz, Ohio, is introducing a new design of fir gutter, which it has named the Shadowline. The gutter is architecturally designed on its outside face to give a shadowline effect which adds to the beauty of design of the building on which it is installed. The Shadowline gutter is



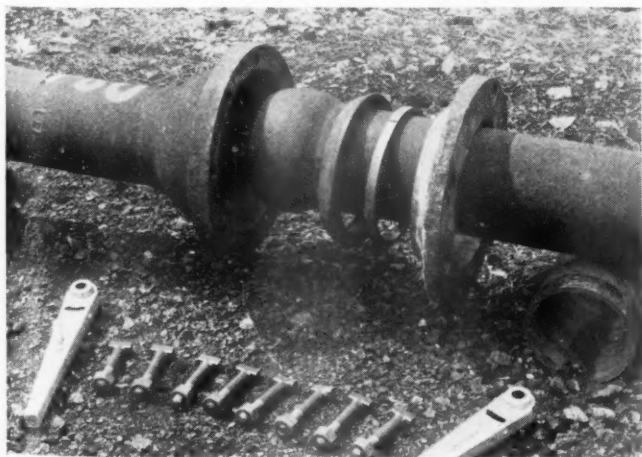
A Section of "Shadowline" Gutter

designed to harmonize with any type of architecture, wall material or roofing. It is available in an aluminum coating, which penetrates and seals the pores of the wood and serves as a waterproof coating and base for finish painting. Solid brass fittings are available for ends, joints and miters to prevent leakage at these points.

The Shadowline gutter is made in five sizes, varying from 3-in. by 5-in. to 6-in. by 8-in. It is installed as an integral part of a building in place of the crown mold.

Mechanical Type of Flexible Pipe Joint

A NEW design of flexible-joint pipe, which is being marketed under the designation Usiflex joint pipe, has been designed by the United States Pipe & Foundry Company, Burlington, N. J., primarily for submarine lines at river crossings, water intakes, outfall sewers and elsewhere where a large amount of joint deflection is required. This is a mechanical-type joint, the component parts of which consist of a ball or spherical spigot end, a spherical socket seat in the specially designed bell end, a socket flange, a rubber gasket tipped with duck, a cast-iron split ring, a cast-iron follower ring and the bolts necessary to retain the assembly. It is



All Parts of the Assembly Can Be Applied Easily

said that these joints can be assembled rapidly in the field, and that the bolts can be tightened easily by hand to the desired tension.

It is claimed that tests have shown that a deflection of as much as 15 deg. per joint can be obtained, and that at any angle up to this maximum the joints are completely water-tight under pressures as high as 300 lb. per sq. in., even when the line is suspended, with no supports except at the ends. It is also claimed that the joint is locked positively against separation under any load that is within the stress resistance of the bolts, making this pipe particularly adapted for laying from a barge or for pulling across a stream, thus making the services of a diver unnecessary.

Fir Plywood Used for Trench Sheeting

DOUGLAS fir plywood may be used effectively for trench sheeting when excavating in unstable material for pipe or conduit lines, or for any other purpose where face shoring is necessary. The plywood panel sheeting eliminates the conventional heavy timber



Plywood Sheeting Is Said to Offer Many Advantages Over Vertical Timber Sheeting

sheeting and wales formerly used, and it is claimed that it offers a number of advantages in construction, with economy in both material and labor.

In this adaptation of plywood, the panels are set up horizontally against the trench faces as excavation progresses, with narrower plywood cover plates over the end joints between panels, which are held in place by means of screw trench jacks. To spread the pressure of the jacks and to prevent damage to the cover plate panels, the jacks are given bearing against timber blocks or planking set vertically.

It is said that, when used in substitution for the conventional vertical timber sheeting, plywood sheeting permits 6 in. to 12 in. reduction of trench width, with a corresponding reduction in the amount of excavation

and backfill. In addition, where plywood sheeting is used, there is no projection of timber above the ground surface to cause interference with surface operations.

Two grades of Douglas fir plywood are recommended for trench sheeting, depending upon the excavating conditions encountered and the length of time that the sheeting will have to remain in place. These are the concrete form grade, designated "PLYFORM," and "EXT-DFPA" grade. Both of these grades are manufactured from selected veneer sheets, bonded together under hydraulic pressure. The essential difference between the two grades is that while the PLYFORM grade uses special water-resisting glues as a bonding agent, which insures prolonged serviceability of the panels under extreme moisture conditions, the panels of the EXT-DFPA grade are manufactured with an improved synthetic resin adhesive which is said to make them strictly waterproof over an indefinite period. Both grades of plywood are made in stock panels of various sizes up to 4 ft. by 8 ft., and in thicknesses ranging from $\frac{1}{4}$ in. (three ply) to $1\frac{3}{16}$ in. (seven ply). Larger and thicker panels can be secured on special order. This range of panel sizes and thicknesses makes possible an economical selection to meet any class of ground conditions.

In a recent extensive pipe-laying job, involving a trench $1\frac{1}{2}$ miles long and 14 to 21 ft. deep, 12,500 sq. ft. of plywood was employed in 4-ft. by 8-ft. panels, $\frac{3}{4}$ in. thick, in substitution for approximately 75,000 ft. b. m. of timber sheeting that had been ordered originally. It is said that this substitution resulted in large savings in both material and excavation costs, and that after exposure to more than four months of winter and spring weather, approximately 65 per cent of the plywood was salvaged for reuse on other important trenching work.

Improved Chemical Proportioning Equipment

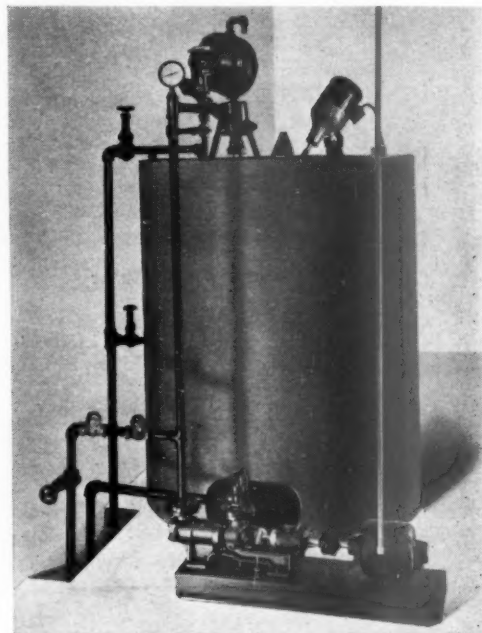
THE National Aluminate Corporation, Chicago, has developed two units of chemical proportioning equipment, which, together, are said to insure positive and accurate dosage of chemicals into boiler water supplies. These new units, known as the Nalco-Moyno



A Nalco Flow Switch on an 8-in. Pipe, Showing in Phantom the Paddle in the Neutral Position

proportioner and the APC regulator, embody simplicity of construction and operation in themselves, and incorporate features which overcome certain disadvantages found in earlier types of regulating arrangements.

The Nalco-Moyno proportioner is essentially a positive displacement pump, the pumping action in which is developed by a helical-shaped metal rotor revolving in a soft rubber stator. The metal rotor is made of suitable material to resist chemical action, while the stator, which



A Nalco Water-Treating Unit, Showing the Chemical Mixing Tank, with the Proportioner at the Base and the Regulator on Top

is inert to water treatment chemicals, is highly resistant to abrasion, and thereby insures long life with minimum tendency toward slippage.

The APC regulator is essentially a by-pass arrangement whereby a certain definite quantity of the chemical pumped by the proportioner is bled continuously from the chemical discharge line back into the chemical vat, the amount bled back being regulated at will to suit the character of water being treated. It consists essentially of an enclosed horizontal submerged orifice, above which a float maintains a constant 12-in. head. With the proportioner pump delivery constant and the bleed-back through the regulator into the chemical tank constant for any specific size of orifice provided, it is evident that the amount of chemical discharged into the raw water line must likewise be constant for each setting of the regulator.

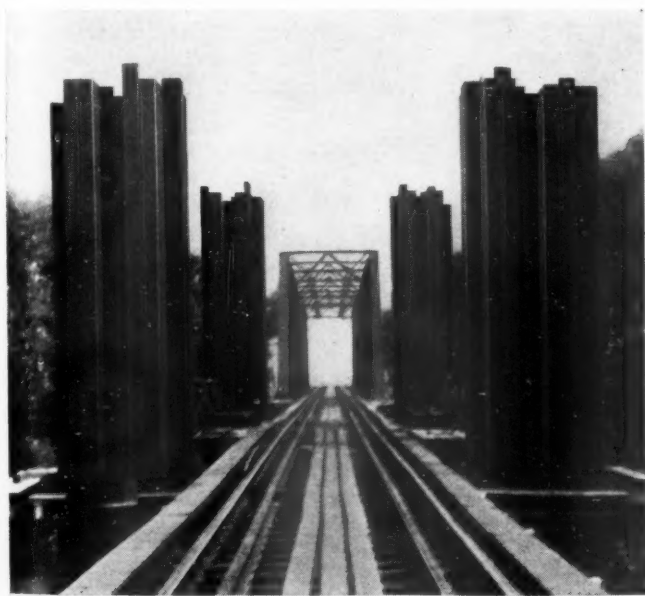
Adjustment of the regulator is accomplished by changing the size of the orifice employed. This is made possible through the use of orifice discs with their openings ranging from $\frac{1}{4}$ in. to $\frac{3}{8}$ in. in diameter. With the same head maintained on the orifice, regardless of its size, it is evident that the amount of bleed-back is increased with increases in the size of the orifice employed, and, correspondingly, that the amount of chemical delivered to the raw water line is reduced. The orifice discs are made of stainless steel to prevent corrosion, affecting their true size, and, with the smallest opening $\frac{1}{4}$ in., it is expected that no difficulty will be encountered through their becoming clogged.

The accompanying illustration of Nalco water-treating equipment shows a chemical mixing tank with a Nalco-

Moyno proportioner at the base, and an APC regulator at the top on the left. The chemical solution flows to the proportioner by gravity from the bottom of the tank, whence it is pumped through the vertical riser pipe at the discharge end to the raw water line outlet, (equipped with two check valves) and to the regulator at the top of the tank. Starting and stopping of the proportioner is effected automatically by means of a flow switch in the raw water line. As long as there is a flow in the line, the proportioner continues to operate, shutting down as soon as the flow ceases.

Bridge Pier Built of Steel Sheet Piling

AN interesting example of the widening uses of steel sheet piling is afforded by a pier construction job in which U. S. S. steel sheet piling MZ-38, manufactured by the Carnegie-Illinois Steel Corporation, Pittsburgh, Pa., was employed for bearing piles for two twin-piers of a railroad bridge. In this construction, each twin pier carries a total load of approximately 2,000,000 lb., which is made possible primarily by the skin friction of the sheet piling in the sand and gravel. The marked economy of this design is evidenced by the fact that it is



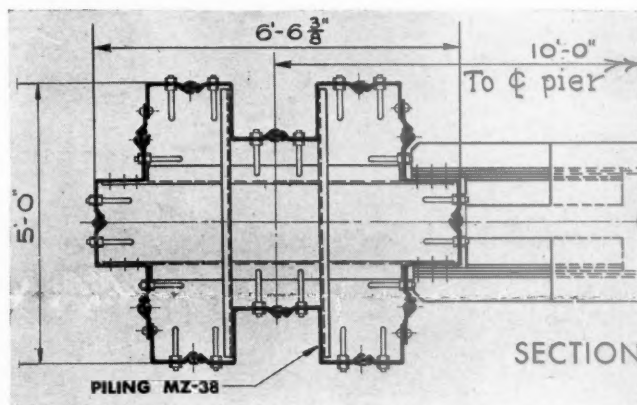
The Steel Sheet Piling Piers Were Constructed With a Minimum of Interference With Traffic

said to have cost about 40 per cent of the cost of constructing one mass center pier for the two truss spans.

This work presented several problems. In the first place it was necessary to design piers which could be constructed quickly and easily, while maintaining traffic over a temporary trestle on the same site. The river bed itself presented a foundation problem as it was composed of glacial drift, consisting of sand, gravel, clay and large gravel, to a depth of 150 ft. to rock. The depth of water at high and low water levels varied from 48 ft. to 16 ft. and the scour at the bridge site was about 15 ft.

The piers were constructed of two rectangular cells of MZ-38 piling 93 ft. long, driven to a depth of 45 ft. to a resistance of 20 to 25 blows per inch for the last

five feet and a resistance for the last foot of 30 blows per inch. Because of the impossibility of furnishing piling of sufficient length, 100 per cent welded splices were installed in a staggered position approximately at the



Half Section of One of the Twin Piers, Showing the Cell Shape Employed

water line and a certain amount of welding was done along the lines of the interlock to resist horizontal shear. A box girder, acting as a strut and portal, was installed between the two piers of each twin-pier at a level of 5 ft. above high water. The penetration of 45 ft. was secured without difficulty and the sheet piling maintained perfect alinement.

After driving the piles, the silt was removed from the bottom of the cells so that tremie concrete could be deposited on a sound foundation of sand and gravel. Owing to the turbulent water conditions and the danger of scour, it was considered vital to anchor the piling to the concrete all the way to the bottom of the cells, so that if future scour should occur there would be no great unsupported length of pile. Therefore, in addition to the provision of frequent hook bolt anchors, a cage of reinforcing bars was lowered into the finished cell before the concrete was poured.

The construction of a sheet piling pier of this type is claimed to have a number of advantages. The driving of the piers on each side resulted in minimum interference with traffic. The work was completed with maximum speed and minimum cost because no cofferdam, form work or excavation was required and it was carried on independent of water hazards because the small units involved are readily handled in swift water or in a stream subject to rapid and marked fluctuations in stage.

An Improved Flasher Relay

ANEW flasher relay, Style FN-16, for the control of flashing-light signals at highway crossings, is being offered by the Union Switch & Signal Company, Swissvale, Pa. This relay, which meets the proposed A. A. R. specification 185-39, is designed for safety, long life, reliable service, simplicity of parts, ease of maintenance and improved efficiency.

The coils are placed outside of the case and can be maintained the same as for standard track or line relays. The copper washers, located on the common core, may be taken off easily to adjust timing without breaking the relay seal. The relay armature is biased by a counter-

weight so that it normally closes the circuits for one-half the total flashing lights. Thus, if the track relay becomes de-energized, and proper energy is not received at the FN-16 relay for its operation, one steady red indication



Improved Flasher Relay

will be displayed by each signal. The relay provides equal periods of illumination for the flashing of lamps of the crossing signals. Because of the simple construction and arrangement of the contacts, circuits can be easily traced and mistakes in connections avoided. Means for effective suppression of radio interference are included as standard equipment.

New and Improved Dearborn Chemical Pumps

THE Dearborn Chemical Company, Chicago, has designed a low-capacity chemical feed pump for railroad water-treating installations, and has made a substantial improvement in its larger capacity Type "R" chemical pump. The new low-capacity pump, known as the Type "S" pump, is designed especially for small treating plants where a compact and inexpensive pumping unit is necessary. As a matter of fact, it is said that the new pump can be used satisfactorily in many plants in place of the company's larger and more expensive Type "G" pump.

The Type "S" pump is of the positive displacement, reciprocating type, driven by an electric motor. It is furnished in two sizes, one with a fixed capacity of one-half gallon per minute, and the other with a fixed capacity of one gallon per minute. It is not adjustable. Like the larger Type "G" pump, the Type "S" pump is of sturdy construction, and it is said that it will insure ac-

curate and efficient chemical feed with minimum attention and maintenance.

The improvement made in the Type "R" chemical pump is designed to produce smoother action and hence more accurate feeding. In earlier models of this pump, a Scotch cross-head was used to convert the rotary motion of the crankshaft into the vertical reciprocating motion of the pump piston. In the improved pump, this arrangement has been replaced by a connecting rod, which eliminates the delays encountered formerly at the beginning and end of each piston stroke, making the piston motion much smoother and thereby insuring more accurate feeding. The other features of the Type "R" pump, including the built-in stroke adjustment and non-corrosive pistons and cylinders, remain unchanged.

New Barco Light Weight Tytammer

THE Barco Manufacturing Company, Chicago, has added a new light weight "tytammer," type K-1, to its line of portable, one-man, gasoline-engine-driven tie tampers, which is 14 lb. lighter than the heavy duty type TT-2 and which is designed to meet a demand for a lighter tamper which will strike a somewhat lighter blow than the TT-2.

The Barco unit tie tampers consist of an air-cooled, two-cycle, single-cylinder gasoline engine, in which a spring-returned piston is propelled downward by the explosion in the combustion chamber, striking an anvil



Part Cut-Away View of the K-1 "Tytammer," Showing Details of Its Assembly and New Streamlined Battery Box

which transmits the blow to the tamping bar. Lubrication is provided by mixing oil with the gasoline, and ignition by a dry cell battery and coil. The tampers

deliver approximately 1,300 blows per minute, and can be supplied with various types of tamping tools.

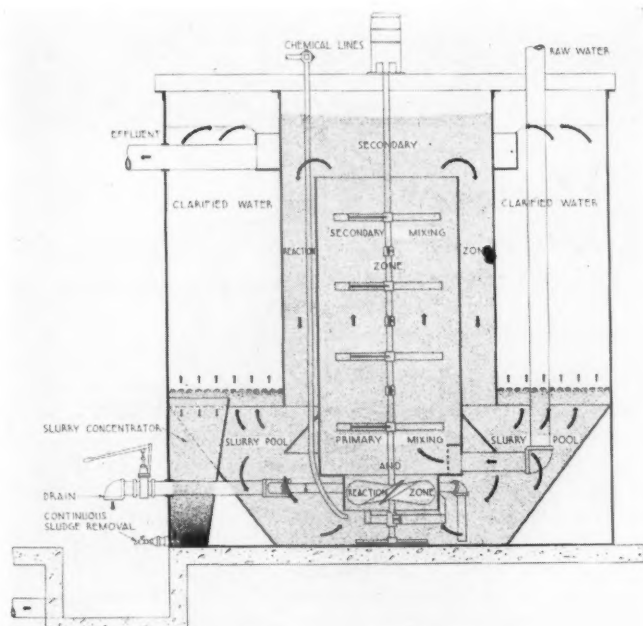
A number of new features have been incorporated in the K-1, most important among these being the gasoline tank, which consists of a spirally-wound steel tubing encircling the cylinder and a streamlined battery box which can easily be dragged over the ties, ballast and rail and which contains the coil and 7½ volt dry cell battery. Other new features include a spring-retained filler cup over the end of the tube tank which serves both as a cap and as a convenient oil measure, the mounting of a circuit breaker on the side of the cylinder and the installation of an improved handle-type stop switch.

Accelator Water Softener

A LIME-SODA water softener, named the Accelator, made by the International Filter Company, Chicago, is based on a new treating method that is claimed to eliminate the necessity for coagulants and special facilities for sedimentation, and to produce more

ward through the secondary mixing zone in the central draft tube from whence it flows into the secondary reaction zone between the inner and outer draft tubes, passing down and out into the slurry pool at the bottom of the treating tank. In the outside or clarification chamber the treated water rises and separates from the slurry and is drawn off at the top of the chamber, while the slurry is again drawn under the skirt of the central draft tube back into the primary mixing zone. A portion of the slurry is continuously skimmed from the surface of the slurry pool, thickened in a concentrating device and discharged continuously as a sludge containing 10 or 12 per cent solids by weight.

In addition to the economies in first cost of small units and the elimination of sedimentation facilities required by the old methods of lime-soda ash water softening, the Accelator is claimed to have the following advantages: a savings of chemicals because chemical over-treatment is not required to bring the reaction to a quick completion; a low turbidity of the effluent characteristically less than ten parts per million; a widely flexible capacity, allowing operation at any rate up to capacity; and intermittent operation is possible without operating troubles or without sacrificing treatment efficiency.



A Line Section Through the Accelator, Showing Its Construction and Features of Operation

complete and rapid softening of water with smaller units at lower cost.

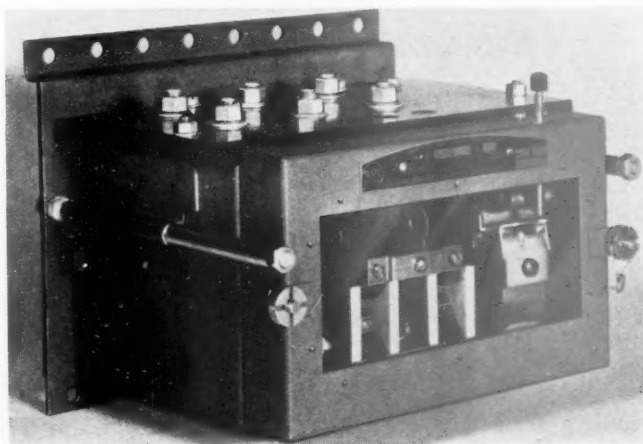
The Accelator consists briefly of a tank with two concentric draft tubes in the center through which a continuous process of reaction and clarification takes place. The feature of the operation is the continuous recirculation and mechanical agitation of a slurry formed by the lime-soda ash treatment, containing about one or two per cent solids by weight, with the raw water and reagent chemicals to accelerate their reaction. This recirculation of the slurry also causes the newly formed solids to deposit by accretion on the particles in the slurry, so that they grow in size and more readily separate from the clear water in the clarification chamber.

In the operation of an Accelator, chemical reagents and raw water are added to the slurry entering the primary mixing and reaction zone at the bottom of the central draft tube. The slurry-water mixture is forced up-

Quick-Detachable Switch Machine Controller

THE General Railway Signal Company, Rochester, N. Y., has perfected a tower-type quick-detachable switch machine controller which permits the conversion of a dynamic indication switch machine into remote control, using the same control and indicating wires if desired. The controller is comprised of a normal and reverse contactor, an overload relay, and a cross-protection circuit breaker with an external reset button, housed in a metal case which may be mounted as a unit on the relay rack. The overall size of the unit is 9⅞ in. wide, 6⅞ in. high and 10 in. deep.

The quick-detachable plug-coupler consists of a plug board which fastens to the relay rack and a receptacle board mounted on the controller. The unit is supported by two rods mounted on the plug board which prevent the connection of the coupler except in the proper position. The contacting members on the receptacle board are tin-plated brass shells that pass over the hairpin-type bronze springs affixed to the plug board on the controller. The plugs are easily centered in the receptacles, and,



Quick-Detachable Switch Machine Controller

when connected, the springs are under tension, giving a positive four-line long-wipe contact. The receptacle members tend to protect the bronze springs, and act as self-cleaning contacts by insertion and extraction. The boards are 1/2-in. phenolic plate.

A contact may also be mounted on the plug board which closes just before the controller is disconnected. This contact maintains the switchboard circuit breaker energized when the controller is removed, thereby permitting normal functioning of all circuits other than the switch machine circuit affected by the removal of its controller. The coupler arrangement provides a positive rapid means of removing a controller and replacing it during periodic inspection without any possibility of circuit errors.

Nalco Phototester for Making Water Analyses

AN electrical device for making rapid colorimetric chemical analyses of locomotive boiler waters at terminals has been devised by the National Aluminate Corporation, Chicago. This device, which is known as the Nalco Phototester, is a small, neatly-encased testing instrument which utilizes the principle of the "electric eye" to determine the chemical analysis of the water. Through the use of the device, the work of making such determinations is greatly expedited, and it is possible



The Nalco Phototester, Complete With One-Ounce Test Bottles

to maintain a definite check on both organic and inorganic chemical treatments.

In the use of the Phototester, a small water sample is drawn from the boiler, and, after being filtered, is placed in a series of one-ounce sample bottles, to each of which a few drops of the proper indicator are added for the specific test to be made. The bottles are then placed, one at a time, in a compartment provided in the instrument, and when the switch is turned on, a microampere reading is taken direct from the pointer and dial of the meter. Each determination is direct and can be made as rapidly as the bottles can be changed in the compart-

ment and the readings taken. Reference to standard charts for each test converts the microampere readings into grains per gallon or parts per million.

Armored Mono-Cast Pipe

ACORROSION-RESISTING pipe known as Armored Mono-Cast Pipe, and manufactured by the American Cast Iron Pipe Company, Birmingham, Ala., consists of this company's standard cast iron pipe with an outside protective layer of concrete and fabric. A 3/4-in. coating of concrete is applied to the outer surface of the pipe, which in turn is covered with a spirally-



Sections of the Concrete Armored Pipe, Showing a Joint in the Foreground

wound fabric jacket and a thin coat of mortar cement applied over the fabric. The concrete is applied under pressure to make it dense and strong and bond it well with the pipe surface. The total thickness of the protective covering is about 7/8 in. The armor is omitted at the bell and for approximately 12-in. at the spigot end, to allow the joints to be made and tested, after which they may be enclosed in a mortar poultice made up on burlap, or small box forms may be used to contain the concrete poured around them.

Armored Mono-Cast Pipe is available in the standard cast iron pipe sizes and is claimed to be a permanent and practical pipe for use in severe and unusually corrosive soil areas, such as exist in old cinder fills and dump heaps, severe alkali soils, brackish or salt marshes, and in swamps, muck and other low wet areas.

A New Finishing Treatment for Water

ANEW water finishing treatment, which is said to improve the quality of both exterior and interior treated boiler waters, and also of untreated water for boiler use, has been developed by the Dearborn Chemical Company, Chicago. This new treatment, known as the Dearborn Stabilizer Finishing treatment, is designed to improve boiler waters in four ways: (1) By preventing scale deposits in distribution and feed lines; (2) by preventing corrosion in boilers; (3) by con-

trolling foaming; and (4) by reducing blow-off losses.

The new treatment, which is furnished as a thick liquid in drums, dissolves quickly in either warm or cold water, forming a solution which can be added readily to the boiler water by an automatic feeder either at wayside plants or on locomotives. It is essentially a blend of several types of tannins and other organic reagents, which is said to act chemically to prevent precipitation, and, physically, to keep precipitated material from forming scale. When used in conjunction with lime and soda water softening plants, it is said that it makes zero hardness unnecessary, and thus simplifies the control of these softeners.

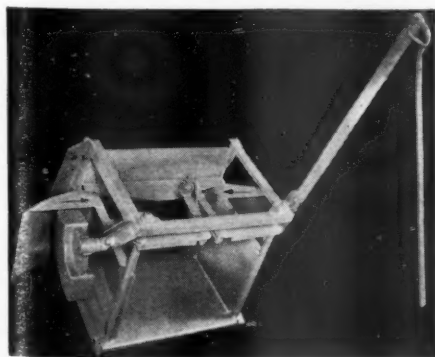
In addition to these advantages, it is claimed that the treatment is more active than tannin alone in absorbing the dissolved gases that cause boiler corrosion, and that it is specially balanced to give protection against intercrystalline corrosion. It is also claimed that because of the foam suppression ingredients incorporated in the treatment, it is possible to double or even triple boiler water concentrations without danger of foaming, a feature which means that carry-over is often prevented and that less heat and water are lost in blowdown.

Nalco No. 81 Treatment

THE National Aluminate Corporation, Chicago, is recommending a treatment for cleaning new or repaired boilers, which is designed to replace the use of soda ash or caustic soda, which research has indicated may be a factor in starting so-called "caustic embrittlement" of boiler steel by concentrating in the seams. The new treatment, known as Nalco No. 81, is said to contain both organic and inorganic chemicals considered by leading authorities on caustic embrittlement to furnish the best protection against such embrittlement. It also contains an oil emulsifying agent which is claimed to be much more effective than soda ash or caustic soda for cleaning out oil deposits. The new treatment is applied to the boiler in the same manner as soda ash or caustic soda, and requires no special attention other than thorough flushing out after the treatment has been completed.

An Improved Coal Gate

THE Ross & White Company, Chicago, has designed a sidecut coal gate with a sway apron which is claimed to be an especially easily operated and safe gate for railroad coaling plants and to have a number of other advantages over the older gates. The new gate is ruggedly constructed and designed to provide easy opening and positive shut-off with one-hand operation.



Shop View of the Gate, Showing the Shutters in Open Position

It is operated by pulling down on the lever to close the gate and pushing upward to open it, which is the reverse of the operation with the old type gates. The movement of the lever controls two V-shaped shutters which swing



A Downward Pull on the Operating Lever Shuts Instead of Opening the Gate

on an arc to each side to open the gate and provide side cut-off by swinging inward until their vertexes are together to close the gate.

The gates are built with a hooded sway apron, providing an eight-foot swing at the unloading end, allowing better loading of the locomotive tender and frequently eliminating the necessity for respotting the locomotive. The control lever is hung to provide operation of the gate from either side or the center, giving the operator an opportunity to avoid the dust, and the apron is raised and lowered by a swift chain hoist which locks in position when up or down, or which may be balanced if desired.

It is claimed that the pulling down on the lever to close this gate is safer than the operation of the old type gates, eliminating the possibility of a trainman being injured or buried by falling coal if he should slip and instinctively hang on to the gate lever. This new type of operation and the ease with which the gates are opened and closed is also claimed to eliminate the possibility of flooding the tender with excess coal or accidentally emptying the chute. It is also stated that the side cutoff feature of the gate operation prevents an operator from "skimming the lumps," leaving slack for the next engine.

Jennite Waterproofing and Roof Coating

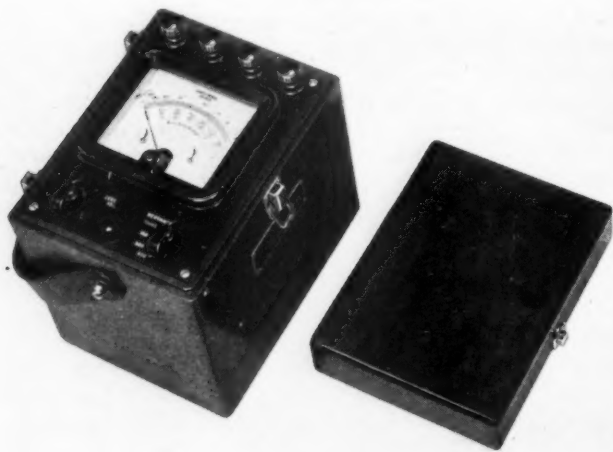
A NEW waterproofing and roof coating, named Jennite, has been developed by the Jennison-Wright Company, Toledo, Ohio, for the protection of concrete, metal or wood surfaces from moisture and corrosive gas fumes. Jennite is a paste type emulsion in the form of an irreversible colloid of a coal tar pitch, which can be thinned with water and sprayed on the surface to be protected, or it may be applied directly with a plasterer's trowel or a rubber edge squeegee. It is usually applied in coats from $\frac{1}{32}$ to $\frac{1}{16}$ in. thick, which dry in a few hours time, forming a tough, waterproof and weatherproof film with a clean, dustless surface.

It is said that a peculiar characteristic of Jennite is

that it has no flow point and does not sag at any temperature and that it produces a surface that does not run in hot weather or crack in cold weather. It is also stated that Jennite is unaffected by brine, hydrogen sulphide, sulphur dioxide and other gases found in smoke and ordinary fumes, and that it may be painted over if the color is objectionable. In addition to its use as a roof coating and as an insulating material, it is said that it can be used for waterproofing concrete surfaces without waiting for the concrete to dry. Jennite may be ordered in gallons, drums or car load lots. A gallon will cover about 100 sq. ft.

Vibro-Meg for Measuring Insulation Resistance

THE Western Railroad Supply Company, Chicago, has placed on the market a new Vibro-Meg instrument for measuring the insulation values of insulation on wires, cables, etc., the most novel and unusual features of which are its principles of design and opera-



The Vibro-Meg

tion. The power supply for the megohm scale consists of two No. 6 dry cells housed in the bottom of the case with a vibrator such as is used in automobile radio power supplies. This vibrator is of the self-rectifying, synchronous type, and is used with suitable choke and capacitor to provide approximately 500 volts direct current for the 0-200 megohm scale. The use of this system of power supply eliminates the necessity of turning a crank to obtain voltage for resistance measurements, insures consistent voltage when testing circuits which have relatively high capacity, and releases the operator's hands for other work, such as recording test data. The desired ranges are selected by means of a rotary switch, and a push button is used to accomplish the switching necessary for first standardizing the instrument, and then taking resistance readings. In addition to the resistance scales, for which two terminals are provided, there are also terminals and scales for voltage readings of either alternating or direct current.

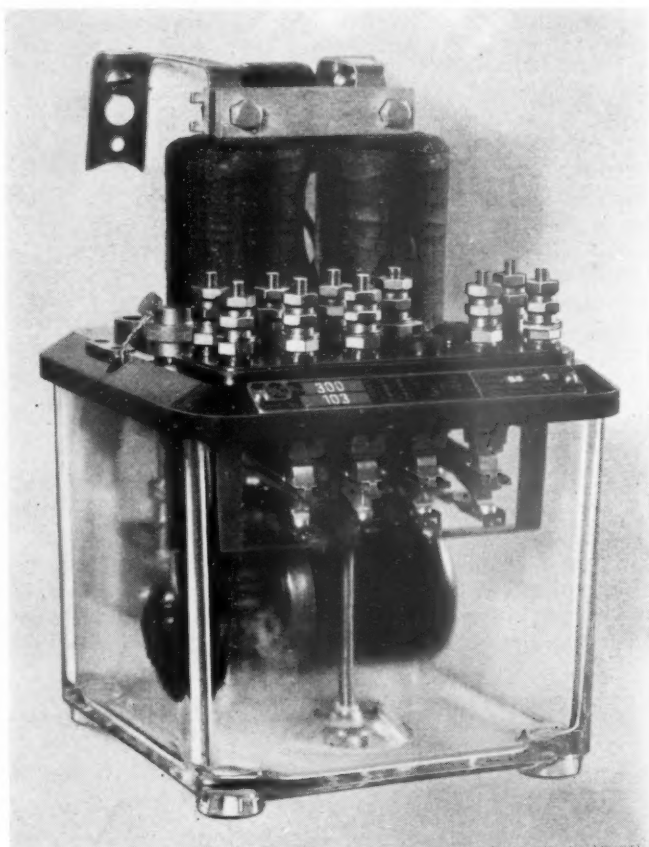
The standard Vibro-Meg has ranges of 0-200 megohms, 0-2,000 ohms, 0-150-300-600 volts a-c. or d-c. The instrument can also be supplied with ranges of 0-200 megohms, 0-2,000 ohms, 0-0.3-15-30 amp. d-c., 0-1.5-15-150 volts d-c., and 0-1.5-15-150 volts a-c. No a-c. cur-

rent ranges can be provided, however. The entire mechanism and power supply of the instrument are housed in a sturdy, polished wood case measuring 5 $\frac{1}{16}$ in. by 8 $\frac{1}{2}$ in. by 7 $\frac{1}{2}$ in., with a removable slip-hinge cover and a carrying strap which folds down out of the way when the instrument is in use. The instrument weighs only 14 lb. Two heavily-insulated, rubber-covered leads 8 ft. long, with a spade terminal on one end and a test clip on the other, are provided.

D.-C. Time-Element Relay

THE General Railway Signal Company, Rochester, N. Y., has designed and is manufacturing a new constant-speed motor-driven d-c. time-element relay, to be designated Type-K, Class-T. This relay was designed for line or local operation to attain more accurate and greater latitude in timing. The relay is slightly larger than the Type-K, Size-4, neutral relay. It is furnished with coils of any resistance required, equipped either with standard A. A. R. terminals or insulated terminals. Contact fingers are articulated, the same type as used on all Type-K relays.

The timing device consists of a small constant-speed d-c. or a-c. motor as required, which drives the timing gear and adjustable calibrated timing wheel on which is mounted a trip for operating a check contact. Timing device sequence of operation is as follows: (1) Energy applied to relay which energizes the starting coils mount-



D.-C. Time-Element Relay

ed in base of relay; (2) starting coils energized, pull armature down, depressing back contacts and engaging timing gear with motor gear train; motor starts operation; (3) after completion of time interval, check con-

tact is opened by trip on timing wheel, closing the circuit to the pick-up coils; (4) relay picks up and holds up, disengaging the timing wheel from the gear train and opening the motor circuit; (5) check contact snaps back to closed position as timing wheel is disengaged and trip is returned to de-energized position.

Four gear trains are available with time adjustments as follows: 2 to 32 sec., 4 to 64 sec., 15 sec. to 4 min., and 30 sec. to 8 min. Tests have shown that practically constant timing is maintained over the voltage range of the battery. Ambient variations in temperature have no appreciable effect.

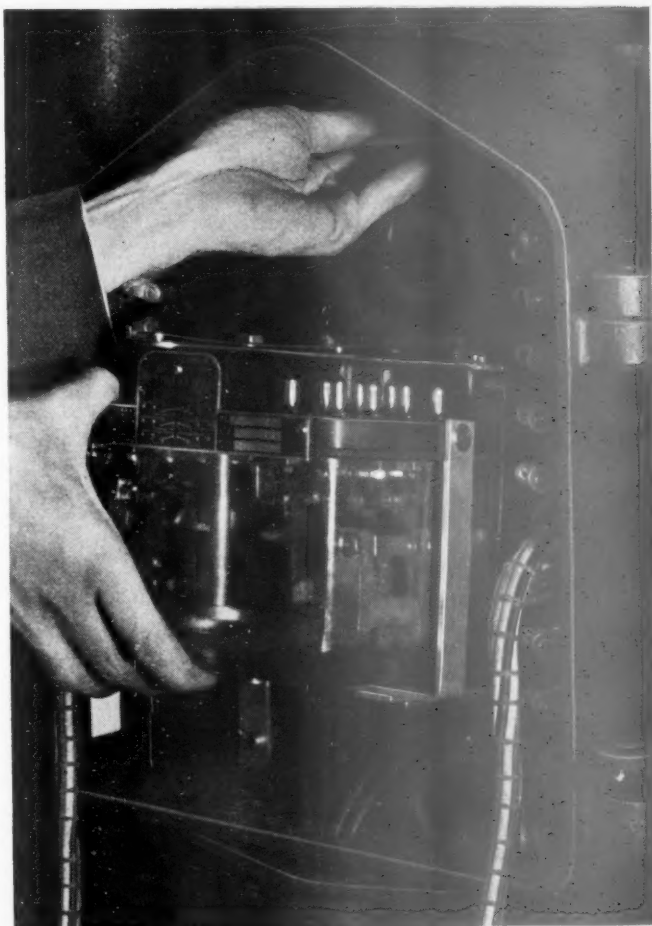
This relay can be supplied without or with a quick-detachable plug-coupler as required. The plug-coupler eliminates the possibility of circuit errors and saves considerable time when changing or replacing a relay at periodic inspection. The plug-coupler consists of a bakelite shell in which are moulded inserts that pass over hairpin-type springs affixed to the terminal posts of the relay. Wires to the relay are attached to the plug-coupler by means of bakelite-insulated-head terminal screws which screw into the inserts in the shell. The bakelite heads are shaped so that they may be tightened by means of an A. A. R. socket wrench.

Improved Searchlight Signal

THE Union Switch & Signal Company, Swissvale, Pa., has developed an improved searchlight signal, the H-5, which is easily installed and maintained and which has a quickly detachable operating unit. This signal incorporates all the basic principles and the major advantages of popular searchlight signals; yet is a radical departure from the types familiar for the past 15 years. Its outstanding characteristics are as follows: The operating unit is quickly detachable and plug connected; the reflector and lamp bulb are independent of the operating unit, and are also quickly detachable on the plug-in principle; the reflector assembly and both lenses of the double combination are mounted in the signal case independent of the operating unit and in fixed relation to each other; the contact capacity of the operating unit is 2F-2B independent for both the yellow and green positions; all back contacts are closed at the red position; the operating units are interchangeable without affecting lenses, reflector or wiring; the reflector assemblies are interchangeable without affecting the operating unit or lenses; the external wiring is permanently affixed to fixed terminals independent of the operating unit; the plug connector feature permits a complete removal and replacement of the operating unit in 30 sec.

The H-5 operating unit has a feature which is a distinct advantage with present-day complex circuits and short allowable time for changing out operating units, in that it is unnecessary to remove any nuts or washers to disconnect the electrical connections to the operating unit. All internal electrical circuits are connected to eight plugs, moulded into each side of the top plate. External connections are made through "jacks" mounted in plug connector housings. The housings are so designed that it is impossible to insert them improperly.

All optical parts, with the exception of the colored roundels, are separated from the operating unit and are permanently located in the signal case, which provides for better beam alignment. The reflector mounting is adjusted and fixed at the factory to assure that the maximum efficiency may be obtained from the lens combina-



The Operating Unit of the H-5 Searchlight Signal Is Easily Detachable

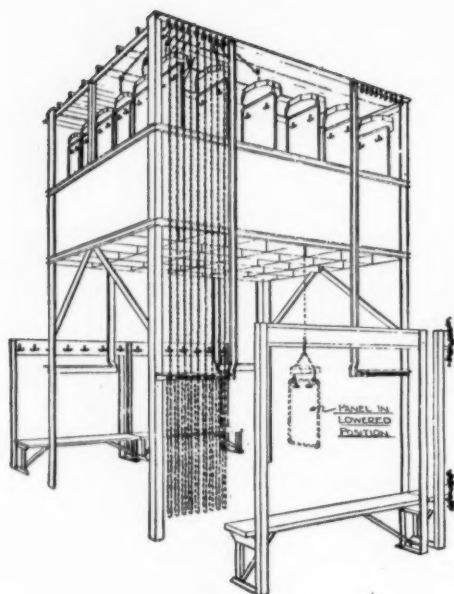
tion. Pre-focused and sealed reflector assembly assures the maximum candlepower obtainable from a reflector and also provides complete interchangeability of all reflector assemblies. The snap-on mounting of the reflector assembly facilitates lamp and reflector maintenance and materially reduces the time necessary to replace an operating unit. A resistor can be provided on the reflector assembly for convenience in adjusting lamp voltages.

Overhead Lockers

TO solve the problem of storing workmen's clothing to insure their drying out between shifts and to get rid of obnoxious odors that cling to clothing when conventional storage methods are used, the Lyon Metal Products, Inc., Aurora, Ill., has devised an overhead locker system.

The system consists of elevated locker cubicles with open bottoms, mounted on an elevated superstructure of steel. In each locker cubicle, there are suspended on a chain a clothes pan and panel with hooks on either side which may be lowered to the floor by means of an individual chain and pulley system. To insure privacy, the lockers in the elevated position may be locked by locking the chain to the superstructure with a padlock. Sturdy benches on the floor level, with uprights behind equipped with clothes hooks, are also available with this locker system.

This type of locker system is available in three rows of six single-faced units, a total of 18 lockers, or in double faced units consisting of a total of 36 lockers or



A Sketch of One of the Elevated Locker Units Showing the Arrangement for Raising and Lowering the Individual Clothes Panels

in combinations of these groups to obtain any amount of storage facilities desired. All steel parts are finished in baked green enamel. Fusible links are provided at three points in each unit, which allow it to drop to the floor in case of fire.

It is said that this system of storage of clothes near the roof where the air is warmer and dryer causes them to dry out faster, to be better ventilated and to rid them of obnoxious odors that might otherwise cling to them.

DeVilbiss Exhaust Fans

A NEW motor-driven exhaust fan known as the Type JG has been designed by the DeVilbiss Company, Toledo, Ohio, to effect a rapid movement of a large volume of free air and is adapted for railroad work in connection with such operations as spray painting or for the removal of smoke, exhaust gases, oil mists, dust from grinding operations or steam and vapor from cleaning and washing units, etc.

The new Type JG fan is available with a $\frac{1}{4}$ hp. or $\frac{1}{2}$ hp. ball-bearing, direct-connected electric motor. The $\frac{1}{2}$ hp. motor turns a four-bladed fan 1725 r. p. m. and has a capacity of 6,350 cu. ft. of free air per minute and the $\frac{1}{4}$ hp. motor turns a two-bladed fan 1725 r. p. m.



The New Type JG Motor-Driven Exhaust Fans Are Designed to Handle a Large Volume of Air

and has a capacity of 5,250 cu. ft. per minute. Both motors are explosion-proof and are suitable for the handling of hazardous as well as ordinary vapors. The ball-bearing motor allows the mounting of the fan unit in any position. The fan ring is made of cast iron and is designed for maximum air delivery and ease of installation. The fan blades are of highly polished aluminum and a strong, durable, one-piece galvanized wire screen safety guard is bolted on the motor side.

These fans are not designed to be used in a duct installation, but a short length of 24 in. pipe not exceeding 3 ft. in length can be used on the outside to direct the exhaust away from the building and to shield the fan from the weather. The fan may be mounted in a panel for use in a window or skylight opening or bolted directly to the wall or ceiling.

Safety Device for Rolling Doors

A N automatic safety device for motor-operated rolling doors and other upward-acting doors has been devised by the Kinnear Manufacturing Company, Columbus, Ohio. It is claimed that, when applied to doors of these types, this device prevents injuries to



The Safety Device Causes the Door to Reverse Its Downward Motion Upon Contacting Any Obstruction

persons and damage to property, if the door is closed carelessly by attendants who fail to ascertain whether the opening has been cleared before they press the push-button control. By this means, the hazard is eliminated which has existed in the past, where the operating-control station is remote from or out of direct view of the doorway.

To make the device effective, a compressible weather strip containing air is placed along the entire length of the bottom of the door. If the door comes in contact with an obstruction as it is being closed, the air in the weather strip is compressed and forced through an impulse switch. As a result, the door is stopped or it may return immediately to the fully-open position, depending on the manner in which the door-control circuit is connected. It is said that even slight pressure on the weather strip is sufficient to assure quick and positive action, and that if the door strikes a person it will cause no injury and only slight discomfort.

NEWS

Transport Should Get No Tax Aid

Don't overlook transport policy
in wiping out waste in govt.,
Brookings advises

"The development of a healthy co-ordinated and self-supporting transportation system is one of the "constructive and far-reaching" steps which the Brookings Institution has recommended in a study of proposed re-organization of the federal government. Substantial savings in governmental costs can be made, the report states, by "pruning" the "pensions, donations, grants, subsidies, loans, special services" which the federal government provides.

On the other hand, "the development of a more consistent social and economic program through the re-examination of broad policies that are now in conflict" would bring "more constructive and more far-reaching" fiscal results than mere pruning. It is at this point that the report makes its recommendation for a "co-ordinated and self-supporting transportation system."

In reviewing the wastes involved in the present dealing of the federal government with transportation, the report says that "the needs of each transportation medium have been presented to the government as a separate and special problem," and "governmental policies with respect thereto have been developed without reference to other forms of transportation.

"As a result, the national government has never considered the transportation problem as a unified whole and with due consideration of the relationships between the several forms of transportation. In consequence, we find certain forms of transportation heavily subsidized and lightly regulated, while others are lightly subsidized and heavily regulated. Some contribute large revenues to the government, while others contribute but little. The vital question is whether such a development promotes a reduction in national transportation costs, or an increase."

Discussing the proposal that there be a Department of Transportation in the federal government, the report states that, if such a department is to function efficiently, it must have "a unified governmental policy" toward transportation to administer.

"Since the country has considered each form of transportation—roads, railroads, waterways, and airways—as distinct subjects, uncoordinated, one cannot get unity of administration until the laws governing

transportation have been unified. Although the development of a unified program might be immediately advanced by bringing the agencies concerned with transportation into a single department or branch of a department, the basic difficulties cannot be met until the Congress revises the substantive law."

The report, in addition to its recommendations as to the direction government reorganization should take, also gives up-to-date information on the nature of the federal establishment, and statistics on employment and expenditures by the government. The report is entitled "Reorganization of the National Government—What Does It Involve?" The authors are Lewis Meriam and Laurence F. Schmeckebier. The book is priced at \$2 by the publishers—the Brookings Institution, Washington, D. C.

Ohio Valley Shippers' Board Meets March 14

The Ohio Valley Transportation Advisory Board will hold its 15th annual and 53rd regular meeting at the Deshler-Wallick hotel, Columbus, Ohio, on March 14. The docket covers regular committee reports, including a discussion of simplification of tariffs and of Ex Parte 104—Part 2. Importance of legislation pending in Congress will also be discussed by the appropriate committee. At the luncheon to be held at 12:30 p. m., arranged jointly by the Columbus Chamber of Commerce and the Columbus Transportation Club, C. D. Young, vice-president, real estate, purchases and insurance, Pennsylvania, will speak on the subject: "Transportation's Value and Necessity in National Emergency."

Proposed Motor Carrier Reports

The Chicago, Rock Island & Pacific would be permitted to extend its motor carrier operations consisting of the transportation of passengers, baggage, express, mail and newspapers between St. Joseph, Mo., and Topeka, Kans., over a specified route if the Interstate Commerce Commission adopts the recommendations of Joint Board No. 36, composed of John E. McCullough of Kansas and John C. Highberger of Missouri.

The Missouri Pacific would be authorized to operate as a common carrier by motor vehicle of general commodities with exceptions, over specified routes, between McGehee, Ark., and Warren, and between certain points in the State of Louisiana, if the Interstate Commerce Commission adopts the recommended report and order of its examiner, C. F. Price.

River Carriers Jittery at I. C. C.

Barge operators fear commission would boost their rates
and drive traffic away

Great anxiety lest they be placed under the jurisdiction of the Interstate Commerce Commission was expressed by representatives of the inland waterway operators when hearings on the Bland bill, H.R. 4307, were begun before the House merchant marine and fisheries committee on March 7. Spokesmen for the inland waterway interests told the committee that they feared that legislation would be enacted which would place the control of their rates under the commission with the result that charges would be raised to near the level of railroad rates. This, they said, would mean the end of inland waterway operations and would destroy whatever inherent advantages that form of transportation possesses. Several times during the hearing the commission was accused of being "railroad minded" and favoring the railroads at every turn.

Chairman Bland, Democrat of Virginia, explained at the opening of the hearing that he had introduced his measure simply as a skeleton bill which would furnish a working basis for the writing of a bill to bring all forms of water transportation under the jurisdiction of the Maritime Commission and to provide for the co-ordination of the activities of the Interstate Commerce Commission and the Maritime Commission. He said that he felt something had to be done in his committee to ward off possible action by the committee on interstate and foreign commerce which is considering the Lea bill which would give the Interstate Commerce Commission authority over the rates of inland waterway carriers.

Eugene Ackerson, a member of the legal staff of the Maritime Commission but appearing at the behest of the chairman of the committee, explained the features of the bill which would place the regulation of all water carriers under the Maritime Commission and require coordination of the activities of both the Maritime Commission and the Interstate Commerce Commission.

I. L. Evers, representing the American Merchant Marine Institute, told the committee that he feared that if the I. C. C. were given control over water carrier rates, it would raise them to a level near

(Continued on page 443)

Pension Board's 1937-38 Report

Latest data on payments released with review of last fiscal year

More than \$7,800,000 a month is being paid to 125,113 annuitants and pensioners on the rolls of the Railroad Retirement Board, according to figures as of January 31, released last week by the Board as it made public its annual report of the fiscal year ended June 30, 1938. The report is a 166-page document covering in comprehensive fashion the Board's activities in administering the Railroad Retirement Act and in preparing for the July 1 effective date of benefits and contributions under the Railroad Unemployment Insurance Act.

Total benefit payments amounting to \$148,886,775 had been made up to January 31. Of this amount \$4,604,233 had been certified by the Board prior to July 1, 1937, \$82,994,286 during the fiscal year 1937-1938, and \$61,288,256 in the seven months of the fiscal year 1939. Total payments in the fiscal year 1939 were greater than the monthly rate of payment would indicate because retroactive payments are included in the total.

Total payments on employee annuities during the fiscal year 1938 amounted to \$46,097,992, and total payments on pensions to \$35,850,995, according to the annual report. Only individuals who were on the rolls of the railroad private pension systems on March 1 and July 1, 1937, are eligible for transfer to the pension rolls of the Retirement Board, under the terms of the Railroad Retirement Act of 1937. The number of pensioners is steadily declining, the report states, since practically all who are eligible have been transferred to the Board rolls, and their numbers are gradually being reduced by death. On the other hand, the number of annuitants increased very rapidly during the fiscal year 1938 and will continue to increase at a lessened rate for many years to come.

Monthly payments amounting to \$6,708,317 were being made on June 30, 1938, to 108,240 persons on the rolls. This compares with \$446,614 a month paid to 7,223 persons on the same date of the previous year. Payments on 51,273 annuities finally certified by the Board, and in force on June 30, 1938, averaged \$69.20 a month, and pension payments to 43,914 pensioners, transferred from the private pension rolls of the railroads, averaged \$58.89 a month.

New applications for annuities under the Retirement Act amounted to 53,255, during the year, making a total of 105,954 claims received since the establishment of the system. About 4 per cent of the total applications had been held ineligible up to the end of the fiscal year. The Board hesitates to declare applicants finally ineligible, the report says, until the applicant has been given every opportunity to establish his right to an annuity.

Tax collections for the system exceeded the expenditures for benefits and costs of administration up to June 30, 1938, according to the report. Total payments under

the Railroad Retirement Act amounted to \$87,598,519, and administrative expenses, since 1935, to \$4,721,761, making a total expenditure of \$92,320,280, as compared with tax collections of \$150,040,901. Investments of \$66,200,000 in special three per cent Treasury notes were credited to the Railroad Retirement Account in the Treasury as of June 30, 1938. Interest on these investments credited during the fiscal year amounted to \$1,410,822.

A total of 962 employers have been ruled as coming under the Retirement Acts by June 30, 1938. Based on figures for the first quarter of 1938, 97.8 per cent of the total number of employees of employers determined to be covered by the Retirement Act at that time, were employees of carriers by railroad, and only 2.2 per cent of the total were employed by non-carrier employers. Determination of specific employers covered by the act has been a most intricate task, the report declares, but with the virtual completion of identification of carriers by railroad, the greater bulk of the task has been completed.

Wages were credited to 2,000,000 individual employee accounts during the calendar year 1937. All of these employees have acquired credits upon which benefits will sometime be payable, the Board points out, either in the form of annuities, lump sum payments, or death benefits to heirs. The report presents a series of summary tables analyzing the earnings during 1937 of employees covered by the Act.

The federal system of unemployment insurance for the railroad industry, created by Congress in June, 1938, will be administered by the Board. The provisions of the law with respect to the actual payment of unemployment compensation will become effective on July 1, 1939. The report describes this law and gives its historical background.

Given Heads World's Fair Ticket Sale to Railway Supply Industry

William B. Given, Jr., president, American Brake Shoe & Foundry Co., has been appointed sponsor for the sale of advance tickets for New York World's Fair to the railway supply industry. In this post, he joins 60 prominent professional and business leaders who will promote the sale of tickets in each of their respective fields.

Southwest Board Meeting

An increase of 1.6 per cent in carloadings for the second quarter of 1939 in the territory of the Southwest Shippers Advisory Board was forecast at the fiftieth regular meeting of that board in Harlingen, Tex., on March 2. The meeting gave consideration to rail transportation legislation now before Congress, and to the perfect shipping and careful handling campaign to be conducted in April. Transportation and Taxation was discussed by Robert S. Henry, assistant to the president of the Association of American Railroads, while at a joint luncheon with the Lower Rio Grande Valley Traffic Club, C. W. Vandervort, secretary of the Growers Industry Committee of Weslaco, Tex., spoke on the Past, Present and Probable Future of the Fruit and Vegetable Industry of the Rio Grande Valley.

Agri. Dept. Carries Ball for Truckers

Propagandizes for "reciprocity," frowns on Ky.-Tenn. weight limitation

With "cooperation of great value" from the National Highway Users Conference, American Trucking Associations, Inc., and other "trade associations," and "much information" from governmental agencies including the Bureau of Public Roads, the Bureau of Agricultural Economics has prepared a special report to the Secretary of Agriculture on "Barriers to Internal Trade in Farm Products." The whole study, covering 104 two-column pages, includes a 22-page chapter on "Railroad and Motor-Vehicle Regulation," and another of 21 pages on "Merchant-Truckers."

A press release summarizes the whole report's findings as recommendations "looking toward the removal of interstate trade barriers which are causing 'incalculable economic loss' to the nation." The regulations and restrictions, which are said to affect "every farm product," are found to include "discriminatory inspection fees, licenses and taxes; conflicting food grading, labeling and packaging laws; and a bewildering maze of quarantines, embargoes and other impositions." Although the report makes no formal recommendations for legislation, it discusses "principles that might be followed by legislative bodies in acting to remove barriers to trade in farm products."

In the latter connection the report suggests that motor vehicle laws could be modified by reciprocal agreements between the states, but "if that is not forthcoming federal action might be necessary." The use of federal grants-in-aid in an endeavor to bring about modifications of state laws and regulations is listed as one possibility; another might be a stipulation that "no further registrations could be required of any motor vehicle moving in interstate commerce which was properly registered in its home state and had, in addition, an Interstate Commerce Commission registration." With respect to peddler trucks—the report calls such operators "merchant-truckers"—it is suggested that they be charged "a fee for the facilities provided for them, sufficient to pay the cost of those facilities—fees for the privilege of doing business should be set at such levels that the per diem amount will be the same or virtually the same for the merchant-trucker as for the established merchant who does about the same daily volume of business."

Discussing state regulation of motor vehicle weights and sizes and port-of-entry laws, the report finds that "although the chief purpose has been to regulate and to tax, not infrequently an important result has been to place a heavy burden upon interstate commerce." It adds that "although no statistical measure is available, there is abundant testimony to the fact that registration and ton-mile taxes are an important discouragement to interstate transportation." Also, there are similar

(Continued on page 444)

Wheeler Digs Up ■ Another Skeleton

Reports that C. & O. made a secret loan to C. & E. I. and says there ought to be a law

Senator Wheeler, Democrat of Montana and chairman of the Senate committee on interstate commerce submitted to the Senate on March 6, the fifth of a series of reports giving further results of his recent railroad holding company investigation. This report, which is entitled "Chicago & Eastern Illinois Railway Company Concealment of Loan Transaction with C. & O. Railway Company," criticizes the C. & O. for "secretly" making a loan to the C. & E. I., which it controlled, without receiving permission from or notifying the Interstate Commerce Commission. The report also reemphasizes what the Senator sees as a need for greater power in the commission to examine the books of banks and railroad subsidiaries and holding companies.

In this case the report says that the C. & O. made a "secret" loan of \$700,000 to the C. & E. I. without knowledge of the matter reaching the commission. This, it is pointed out, was accomplished by routing the loan through the Midland Bank of Cleveland, "whose directors were associates of the holding company interests controlling the Chesapeake & Ohio." In an accompanying statement Senator Wheeler charged that the bank acted as "a mere dummy." "The whole transaction," according to the Senator, "was put through in such a way as to hoodwink the I. C. C., the investors and the public."

Continuing his statement, Senator Wheeler asserts that "The chief evidence of the loan—a \$700,000 promissory note of the C. & E. I.—was quickly gotten rid of. The Chesapeake & Ohio merely 'sold' it to a wholly-owned non-carrier subsidiary which did not have to file any reports with the Interstate Commerce Commission. When the Chesapeake & Ohio came to file its annual reports with the commission it was able to omit any reference to the note and thus still keep the commission in the dark. To prevent the recurrence of such unsavory transactions, the I. C. C. must be given power to examine the records of banks like the Midland and to obtain full reports from non-carrier subsidiaries of railroads. As the law now stands, the commission is blindfolded."

The report not only alleges that the C. & O. was able to "misuse" railroad funds, but it contends that it was also able to obtain repayment out of government funds through a loan to the C. & E. I. by the reconstruction Finance Corporation.

"Such a loan of taxpayers' money could never have been procured," contends the Montanan, "if the applicant had openly stated that the purpose was to bail out the prosperous Chesapeake & Ohio. The I. C. C., whose approval was required before the R. F. C. loan could be made, was kept in ignorance. Worse still, it was affirmatively misled and deceived. When the government funds were thus procured, the

Chesapeake & Ohio did not show its face. Even its subsidiary did not appear, but acted through a go-between, another Cleveland bank whose directors were associated with the Alleghany holding company interests—the Union Trust Company."

"By the time the snarl of misrepresentation was finally untangled and the true facts ascertained, it was too late. The C. & E. I. was in bankruptcy, and even a criminal prosecution impossible. The statute of limitations had already run against such a prosecution under the law covering fraudulent procurement of R. F. C. loans."

The Senator concludes his discussion of the report by saying that this "kind of sharp dealing cannot be permitted to continue" and reiterates the fact that he has already introduced a bill, S. 1310, which is designed to remove some of the "legal blindfolds from the commission and give it adequate power to examine the records of railroad holding companies, subsidiaries, banks, stockholders, etc., instead of limiting its power to the examination of railroad books which tell only a part—and often a misleading part—of the story." It is also pointed out that the bill requires non-carrier subsidiaries to file reports along with the railroads that own them.

Status of R. F. C. Rail Loans

The monthly statement of the Reconstruction Finance Corporation as of January 31, 1939, shows disbursements to railroads (including receivers) of \$626,842,661 and repayments of \$189,053,827.

Annual Meeting Freight Claim Division

The annual meeting of the Freight Claim Division of the Association of American Railroads will be held at St. Louis, Mo., on May 23 to 25.

Transportation of Explosives

The Interstate Commerce Commission by Commissioner McManamy has issued another order in No. 3666, superseding and/or amending in certain specified respects the regulations for the transportation of explosives and other dangerous articles. The decision is dated February 13, and it becomes effective May 15.

The Canadian Roads in January

An increase in operating revenues of \$173,373 and a decrease in operating expenses of \$729,185 for January as compared with the similar month of last year, are shown by the Canadian National Railways. Operating revenues were \$13,495,005, as compared with \$13,321,632 in January, 1938. Operating expenses were \$14,103,200, against \$14,832,385 during the corresponding period of last year.

The operating deficit for January was \$608,195 as compared with \$1,510,753 in January last year.

The Canadian Pacific in January had net operating revenues totaling \$461,002, a decrease of \$96,144 from the \$557,146 net reported for the like month of last year. The month's gross showed a reduction of some \$616,000, but the company managed to cut its expenses by approximately \$520,000. Gross for the month was \$9,699,062 and expenses totaled \$9,238,059.

British Truckers O.K. "Square Deal"

Road operators agree with principles of railways' bid for freedom in rate-making

Representatives of British railways and a committee of common and contract truckers' organizations have reached an agreement under which the truckers raise no objection to the principal proposals of the railroads' "square deal" program. As a result of the conference a joint memorandum embodying the agreed proposals will be submitted by the two industries to the Transport advisory council.

The truckers' committee which met with the railway conferees comprises representatives of national organizations formed by the holders of "A" and "B" licenses. ("A" licensees are common carriers and "B" licensees are contract carriers.) Its members agree to support the railways' proposal for repeal of the existing regulation of rates on merchandise traffic together with such matters as classification, publication of rates and "undue preference" and freedom to decide the charges and conditions for the conveyance of merchandise. These proposals form the basis of the railroads' "square deal" plea originally presented to the Transport Advisory Council on November 23, 1938.

The truckers have given their support to the plan on condition that the following safeguards be included in any bill removing railway restrictions, all of which the railways have agreed to: (1) a voluntary system of freight classification will be maintained; (2) public lists of rates for the use of shippers will be continued (although removal of statutory obligation to do so is sought); (3) shippers will have the right of appeal on the question of reasonableness of rates to a duly constituted tribunal; (4) due regard will be given to the reasonableness of rates with a view to avoiding uneconomic or prejudicial levels; (5) no interference will be made with the right of the shipper to use private highway vehicles under so-called "C" (i. e., private trucking) licenses.

With a view to affording the highway carriers themselves freedom to negotiate agreements, the railroad representatives for their part, have agreed that they will not, unless exceptional circumstances arise, raise any objection for a period of two years after they have been given their freedom to applications by truckers for (1) the renewal of existing "A" or "B" licenses; (2) the granting to existing operators of "A" licenses for additional vehicles; and (3) the granting to existing operators of additional "B" licenses for vehicles whose operations are limited to a radius of 25 miles.

The railways reserved for themselves, however, the right to furnish the licensing authority information concerning the existing facilities which they provide and to object to any application on the ground that the applicant has failed to comply with the conditions of the license. In turn, the

trucking industry has promised to co-operate with the railroads in securing observance of the conditions imposed by highway operators' licenses.

The conferences between the representatives of the railways and truckers covered not only agreements concerning proposals for granting freedom to the railways in rate making but also covered possibilities of co-ordination of rail-highway services and rates. The representatives agreed to set up voluntarily a central committee to arrange measures of co-ordination, which will have as its immediate task the formulation of a body of principles according to which voluntary agreements can be made regarding rates, whether individual or joint. Highway representatives in this connection expressed the opinion that the large number of operators in the truck field makes voluntary agreements unsatisfactory and suggested that some form of statutory control be set up as a preliminary to any steps toward adequate co-ordination. They urged further that any bill repealing restrictions on railway rates should include clauses providing for machinery to sanction agreements and set up satisfactory rates and conditions to be observed by all "A" and "B" truck license holders and by the railway companies when concerned.

By this agreement, the British roads bring their campaign for a "square deal" into the home stretch. Important shippers have already agreed with the major policies of the "square deal" plan, as was reported in the *Railway Age* of February 11, page 275; the Minister of Transport has indicated his willingness to go along with the roads. The support of the canal and coastwise steamship interests and a unified expression of opinion by the shippers, together with their legislative support remain therefore the only unsettled factors.

Junior Traffic Club of Chicago Elects Officers

At the annual meeting of the Junior Traffic Club of Chicago, on March 2, the following officers were elected for the ensuing year: President, John Middleton, traffic manager of the Pioneer Paper Stock Company; vice-president, L. B. Freeman, chief clerk of the Grand Trunk-Canadian National; secretary, William Noorlag, Jr., assistant traffic director of the Chicago Association of Commerce; and treasurer, Jack Zorn, clerk of the Chicago & North Western.

20 Pullmans at 84 M. P. H.

The results of a recent test run of the Atlantic Coast Line's steam locomotive No. 1800 between Jacksonville, Fla., and Richmond, Va., are reported in the latest issue of "Baldwin Locomotives," quarterly publication of the Baldwin Locomotive Works. Herein it is revealed that the locomotive, one of 12 Class R-1, 4-8-4 type built by Baldwin as described in the *Railway Age* for December 24, 1938, page 908, hauled the road's 20-car "Havana Special" along a five-mile stretch at an average speed of 84 m. p. h. At another point the locomotive performed a sprint of 13 miles in length at 73.6 m. p. h. In particular the test run showed decided improvements

in acceleration over calculated performance. The test train, which weighed approximately 1500 tons, attained a speed of 70 m. p. h. in 12.5 minutes over a distance of 11 miles. Calculations made prior to the test indicated that nearly 22 minutes for a distance of 20 miles would be necessary to attain this speed.

Freight Car Loading

Revenue freight car loadings for the week ended March 4 totaled 598,691 cars, the Association of American Railroads announced on March 9. This was an increase of 38,082 cars, or 6.8 per cent above the previous week, an increase of 45,799 cars, or 8.3 per cent as compared with the corresponding week of 1938, and a decrease of 131,638 cars, or 18 per cent under the comparable 1937 week.

As reported in last week's issue, the loadings for the previous week ended February 25 totaled 560,609 cars, and the summary for that week, as compiled by the Car Service Division, A. A. R., follows:

Revenue Freight Car Loadings			
For Week Ended Saturday, February 25			
Districts	1939	1938	1937
Eastern	124,408	108,867	155,529
Allegheny	109,446	92,789	147,121
Pocahontas	43,883	35,028	54,740
Southern	90,156	85,589	110,801
Northwestern	64,523	61,920	72,207
Central Western ..	86,131	85,067	99,566
Southwestern	42,062	42,679	52,429
Total Western Districts	192,716	189,666	224,202
Total All Roads ..	560,609	511,939	692,393
Commodities			
Grain and Grain Products	28,885	30,215	27,342
Live Stock	9,935	11,450	10,991
Coal	131,646	101,613	159,416
Coke	7,086	5,141	11,945
Forest Products ..	25,484	25,819	34,465
Ore	7,884	6,818	10,706
Merchandise L.C.L.	133,965	134,938	153,264
Miscellaneous	215,724	195,945	284,264
February 25	560,609	511,939	692,393
February 18	580,071	535,866	711,314
February 11	579,918	542,991	688,523
February 4	576,790	564,740	671,227
January 28	549,379	553,176	653,022
Cumulative Total, 8 Weeks	4,599,852	4,412,253	5,477,906

In Canada.—Carloadings for the week ended February 25 totaled 39,888, practically the same as for the previous week but 6,539 below last year's total, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
February 25, 1939	39,888	22,119
February 18, 1939	39,886	22,933
February 11, 1939	39,227	22,941
February 26, 1938	46,427	20,921
Cumulative Totals for Canada:		
February 25, 1939	313,350	180,411
February 26, 1938	359,865	175,044
February 27, 1937	371,219	217,863

Illinois Central Suggestion System

A plan for stimulating and rewarding employees for suggestions that will save money or improve railroad operations, named the Employees' Suggestion System, was placed in effect on the Illinois Central on March 6. The organization will consist of a general suggestion committee at Chicago and division suggestion committees on each operating division and at the Paducah and Burnside shops. Harvey C.

Marmaduke, chief clerk to the vice-president and general manager at Chicago, has been appointed manager of the Employees' Suggestion System and will devote his entire time to this work, serving as a member of the general suggestion committee and as an ex-officio member of the division committees. Under the new system, employees will submit suggestions unsigned on numbered cards, which will be furnished, retaining a stub with the same number. Weekly bulletins will be posted acknowledging suggestions by number and the winners will present their stubs to receive the award, which will be based upon the value of the suggestion.

Allegheny Shippers Board to Meet March 16

The Allegheny Regional Advisory Board will hold its 40th regular and 12th annual meeting at the William Penn hotel, Pittsburgh, Pa., on March 16. As a special feature in the regular committee reports, motion pictures of impact test experiments in handling carload traffic conducted by the Freight Container Bureau of the Association of American Railroads and the Pennsylvania at Dennison, Ohio, will be shown in connection with the report of the freight claim prevention committee. Following a report of the legislative committee, an open forum discussion of national legislative proposals will be carried on by J. V. McMahon, Youngstown Chamber of Commerce, T. R. Langan, traffic manager, Westinghouse Electric & Manufacturing Co.; W. B. Shepherd, assistant general traffic manager, Aluminum Company of America; and Charles Donley, president, National Association of Advisory boards.

During the luncheon session, which begins at 12:30 p. m., Fairman R. Dick, member of Dick & Merle-Smith, investment bankers of New York, will discuss the subject "Peanuts, Bananas and Railroads, or the Injustice of the Multiplication Table."

Hearings Concluded on the Chandler Bill

Hearings on the Chandler bill to facilitate voluntary railroad reorganization were concluded before a judiciary subcommittee on March 6. At the conclusion of hearings, Representative Chandler, Democrat of Tennessee and chairman of the subcommittee announced that his group would have the bill ready to report to the full judiciary committee by the latter part of this week or the first part of next.

During the hearing the position of the Reconstruction Finance Corporation was made known when chairman Chandler placed in the record a letter from Jesse Jones, R. F. C. chairman, to Chairman Sumners of the full judiciary committee giving that group's views on the bill. Mr. Jones suggested that the bill be modified so that the courts could approve a reorganization plan which has the approval of two-thirds of "all security holders and a majority of every class." The bill now requires approval by 75 per cent of all creditors and at least 60 per cent of each class.

Mr. Jones, in his letter, said that "I

think the bill will be helpful to some roads which are having difficulty earning their fixed charges. It seems to me that where as many as two-thirds of all security holders and a majority of every class agree upon a modification and rearrangement of the capital structure of a railroad, there should be a legal way of making it effective. The only objection I see to the Chandler bill is that it provides for substantially larger percentages than these."

J. E. Shatford, representing the Railroad Security Owners Association, proposed that the bill be modified to permit a voluntary reorganization plan to become effective when it had the approval of 66% per cent instead of 75 per cent of all creditors. Approval of the bill as drafted was given by F. L. Mulholland of the Railway Labor Executives Association.

Club Meetings

The Car Department Association of St. Louis, Mo., will hold its next meeting on March 21 at the Hotel Mayfair. M. E. Fitzgerald, master car builder, Chicago & Eastern Illinois, will present a paper entitled "The Car Inspector." A dinner will precede the meeting.

The 56th annual meeting of the New England Railroad Club will be held on March 14 at 6:30 p. m. at the Hotel Touraine, Boston, Mass. Election of officers for the coming year will be held. A four-reel motion picture in technicolor with sound, presented by the United States Steel on "Steel—Man's Servant" will be shown.

The Car Foremen's Association of Chicago will hold its next meeting on March 13 at 8 p. m. at the La Salle Hotel, Chicago, Ill. "Chilled Iron Wheels" will be presented by the Griffin Wheel Company.

The Traffic Club of New York will hold its next luncheon meeting at the Hotel Biltmore, New York, on March 15. M. L. Wilcox, director of operations and traffic,

United States Maritime Commission, will speak on the "Reconstruction of the American Merchant Marine."

The Toronto Railway Club will hold its "Ladies' Night" at the Royal York hotel, Toronto, Ont., on March 27, at 8:30 p. m., in place of the regular March meeting. A program of entertainment, dancing, cards and refreshments has been arranged.

"Coronation Scot" Ready to Go

The Coronation Scot, London Midland & Scottish express train which will be on view at New York's World's Fair will make its first official trip in this country on March 18 between Baltimore and Point of Rocks, Md., on a special trip for the press. On March 21 the train will leave Baltimore for its 3,121-mile tour over eight American railway systems, which was described in the *Railway Age* of February 11. Included in the train's crew throughout the trip will be Edward De Lions, a Canadian Pacific sleeping car porter, who was attached to the L. M. S.'s Royal Scot during its North American tour in 1933. With him will be a companion C. P. R. porter. In their temporary posts the men will wear the regular porter uniform of the Canadian Pacific, together with standard L. M. S. button, cap, badge and collar tabs.

Lord Stamp, chairman of the London Midland & Scottish, declared in a special statement on February 27 concerning the American tour and exhibition of the Coronation Scot that sentiment alone would not justify the cost of shipping a complete train to America and that there is ample evidence that the visit of the company's Royal Scot in 1933 was commercially justifiable. It is his belief that the Coronation Scot comes to America not only as "a messenger of good will" but also as a representative of the technical progress which the British railways have made.

It is his belief that "British and Ameri-

can railroads have much in common—a high standard of safety and technical achievement, a keen desire to fulfill as efficiently as possible their function as servants of the public, and the handicap of intensive and one-sided competition from other forms of transport such as trucks. The last-named question is occupying a great deal of British public and political attention at the present time, when the main line railroads are campaigning vigorously for a 'Square Deal' to enable them to compete fairly and equitably with other forms of transport."

Will Push Interterritorial Rate Bills

Southern and Western senators and representatives interested in legislation to equalize interterritorial freight rates indicated at a conference this week their intention to press for action at the present session of Congress, despite the disposition of the House committee on interstate and foreign commerce to do nothing about the matter and the hope held out by the recently-issued proposed report of Interstate Commerce Commissioner Lee and Examiner Corcoran, recommending that the commission give the South about all it asks in the so-called Southern Governors' rate complaint.

Separate hearings on rate-equalization bills were held last week before the House committee on interstate and foreign commerce and a sub-committee of the Senate committee on interstate commerce headed by Senator Hill, Democrat of Alabama. At the close of the House hearing the committee indicated a disposition to do nothing further at this time. Chairman Lea thought the hearing had "accomplished the purpose of those asking for it by drawing attention of the public to rate differentials." He also pointed out that nearly all witnesses had testified that any adjustments necessary could be made by the I. C. C.

However the more active Congressional proponents of the legislation held the above-mentioned meeting on March 7; and out of it came a threat of a filibuster against any general transportation legislation unless the rate-equalization matter is included or first disposed of. Senator Hill's guess was that there would be action at the present session. He added that "It will be a long time before there will be any railroad legislation if they don't do something about this." Among others attending this March 7 conference was Representative Ramspeck, Democrat of Georgia, leader of the House's South-West bloc.

Insulating Materials Being Tested at Purdue

The answers to questions regarding the relative efficiency and effective service life of various insulating materials used in railway equipment are being sought by the Purdue University Engineering Experiment Station in an extensive series of tests being conducted by Prof. W. T. Miller and T. K. Sanders of the Purdue Engineering Experiment Station staff, and M. M. McClure, representing the Gustin-Bacon Manufacturing Company, Kansas City, Mo. The tests are being made in co-operation with the Owens-Corning Fiberglas Corporation, and the Gustin-

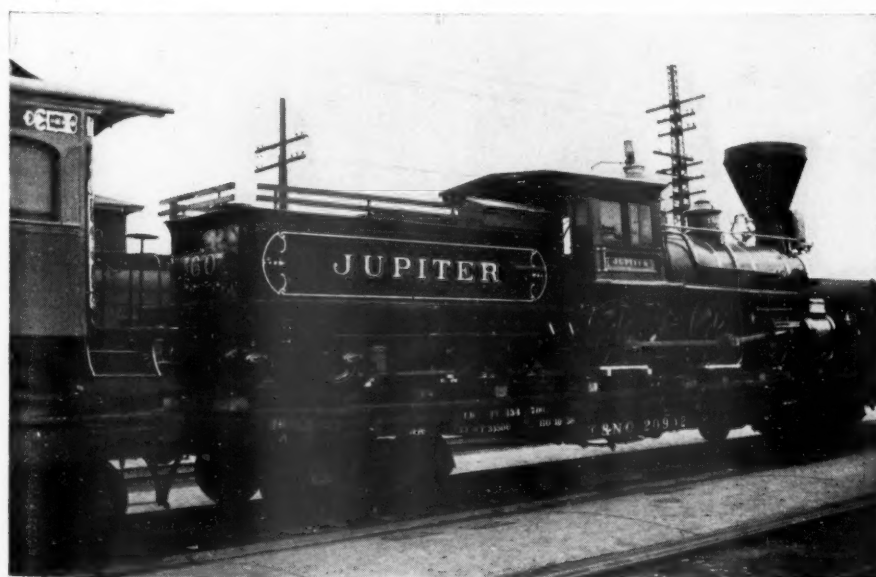


Photo by S. F. Merritt

This Baldwin 4-4-0 Was Built for the North Pacific Coast Road in 1876 and Was in Active Service on That Road and the Nevada Central Up to 1938. Here It is on Its Way to the San Francisco Golden Gate Exposition After Reconditioning at the Southern Pacific's West Oakland Shops

Bacon Manufacturing Company, and are designed to develop both the mechanical and chemical properties of 38 insulating products under observation.

In developing a method of testing, the Purdue engineers have worked out an 8-hr. schedule, which reproduces in that period the conditions that an average car would experience in about 30 days of use on a railroad and as a result, the insulating materials being tested already have been given the same wear that they would receive in 74 years of actual service. The tests have been under way approximately two years, during which period some of the materials have fallen by the wayside while others have shown that they will stand up under the severe conditions imposed on them.

As one of the steps in the testing, there was designed and built a "weathering room," 8 ft. by 8 ft. by 10 ft. In this room, the samples of insulations are subjected to repeated cycles of high humidity and drying which resemble all the conditions they would get in actual service applications in railway passenger and refrigerator cars. The samples under test rest in wire trays, half of them stationary and the other half subject to a vibration which resembles the most severe condition found in railway equipment.

In another room, known as the "hot box," a complete panel from the side wall of a refrigerator car has been set in, enabling the different materials to be tested for their insulation value, moisture absorption, drying characteristics and durability. There is a complete refrigerating unit in another room, as well as two of the largest electric hot plates ever used for determining thermal conductivities, each 30 in. square, to aid in the complete studies being made by this laboratory.

At regular intervals, samples of the various insulation are analyzed chemically and physically to detect any changes in insulating properties. Automatic switches control the testing processes but results must be checked regularly. It is anticipated that the results of this investigation will furnish valuable information to those interested in insulating materials and their various applications to railway equipment.

Bills Introduced in Congress

Senator Davis, Republican of Pennsylvania, has introduced in the Senate by request S. 1668, a bill which would amend the act relating to the liability of common carriers by railroad to their employees in certain cases by adding the following language: "Provided, That in any case where an action has been brought under the laws of any State or Territory for workmen's compensation for the injury or death of an employee and the employer has pleaded as a defense to such action for workmen's compensation the fact that the employee was engaged in interstate commerce at the time of the accident, and the fact that the employer has sought to avoid the payment of workmen's compensation by such plea is proven in any action hereafter brought under this act or its amendments in all such cases the employer shall be liable under this act for the injury or death of

such employee in an amount, as a minimum, equivalent to the amount of workmen's compensation provided for under the laws of the State or Territory in which the employee was injured or killed."

Representative Gossett, Democrat, of Texas, has offered in the House H. R. 4681, a bill to require the Interstate Commerce Commission to investigate in any "proceeding before the commission involving the lawfulness or fairness of through railroad freight rates between different sections of the United States where different freight-rate levels have heretofore prevailed . . . to determine and remove such inequality and to determine the extent to which a free movement of the traffic involved in such investigation will be promoted or encouraged by removing the inequality between the interterritorial rates and the rates on the same class of traffic in the lower rated territory, and readjust the rates so as to eliminate any inequality which may be found to exist."

Senator Byrd, Democrat, of Virginia, has reported to the Senate from the special committee to investigate executive agencies of the government S. 1706, a bill similar to Representative Cochran's in the House, which would provide for the reorganization of certain executive branches of the government, but would specifically exempt the Interstate Commerce Commission for any form of reorganization by the President. The House version of the bill has been reported from committee and is in the process of being discussed on the floor as this issue goes to press.

Senate Committee Hears Alldredge

J. Haden Alldredge, President Roosevelt's nominee for the Interstate Commerce Commission position now held by Commissioner Frank McManamy, was be-

fore a sub-committee of the Senate committee on interstate commerce on March 8 for questioning by Senator Reed, Republican of Kansas. Meanwhile President Roosevelt said at his March 7 press conference that he had heard nothing of reports that it had been suggested that he withdraw from the Senate his nomination of Thomas R. Amlie to succeed Commissioner B. H. Meyer. The reports on the Amlie case had it that the president had been advised that Mr. Amlie would not be confirmed if his name went before the Senate.

The Amlie nomination as well as the reappointment of Commissioner Lee is before the above-mentioned Senate sub-committee, which is headed by Senator Johnson, Democrat of Colorado. Senator Reed's questioning of Mr. Alldredge was designed to develop the nominee's views with respect to the present interterritorial rate adjustment. The witness denied that he was the author of the so-called Southern Governors' Rate Complaint on which the I. C. C. recently received a proposed report, as noted in last week's issue. Neither was he aware that he had influenced that complaint in any way, although he added that the report seems to confirm "the justice of the complaint."

After much discussion with Senator Reed about the weight which should be given to traffic density in fixing rates, the nominee read a brief statement which he said epitomized his general position. The statement follows:

"One of the major purposes of the law regulating common carriers, as its original sponsors stated and as the courts and Interstate Commerce Commission have since confirmed, is to secure so far as practicable, equality in the facilities and services of transportation and in the rates charged therefor. I believe in the wisdom and the

* * *



Three Railway Supply Men active in the National Association of Manufacturers are here shown at the First 1939 Session of the Board of Directors. They are, Left to Right, W. A. Carson, President, Sunbeam Electric Manufacturing Co.; F. N. Bard, President, Barco Manufacturing Co.; and Charles R. Hook, President, American Rolling Mill Company. Mr. Hook is Chairman of the Board of the Association, and Mr. Carson is a Member of the Committee on Economic Policy

soundness of this objective and I think the Interstate Commerce Commission should constantly seek to attain it as well as all other purposes of the law in every reasonable way not only where the immediate interests affected by transportation are concerned but also where the interests of rate regions and sections of the nation as a whole are involved."

Bus Concern Waxes Big and Prosperous on "Benevolent Public"

The size of a typical bus operating company in relation to the railroad with which it competes, its profitability and its comparative freedom from burdens of property investment and taxation comprise the subject-matter of a message to employees of the Louisville & Nashville by President J. B. Hill, in the current issue of the L. & N. magazine. Analyzing the Southeastern Greyhound Lines in illustration, Mr. Hill points out that this company operates over a road mileage about equivalent to that of the Louisville & Nashville and for the year ending December 30, 1938, carried 4,346,668 revenue passengers, 36 per cent more than the Louisville & Nashville. It received an average of 93 cents from each passenger carried and hauled them an average distance of 65 miles compared with 107 miles for the Louisville & Nashville. Then quoting various inventory and financial items from a prospectus concerning the Southeastern Greyhound Lines, the Louisville & Nashville president concludes: "Here is a company operating over as wide a territory as that of the L. & N., hauling 36 per cent more passengers than the L. & N., having its principal tangible property represented by 176 buses with depreciated value of about one million dollars, with only 800 employees and earning about 50 per cent on its capital stock, and yet without a single dollar invested in roadway, bridges and similar facilities."

Mr. Hill points out that he recites the

facts about the Southeastern not as personal criticism, but because it chances to be the only company about which he has the full facts. He has no quarrel with its management merely because it "is alert to seize the advantages handed to it by a benevolent public." He then observes that in the future bus and truck operators and manufacturers will petition state and federal legislation to obtain more favorable laws for highway operation, and appeals to his employees for their own self-interest to be active in calling upon national and state representatives to keep the size and weight of highway vehicles within reasonable limits and to curtail as much as possible long-distance highway service by both bus and truck.

"Union Pacific" Film to Be Released in April

"Union Pacific," a film depicting the construction of the Union Pacific in competition with the Central Pacific, and portraying "romance," Indian wars, wrecks and the driving of the golden spike at Promontory Point in May, 1869, has been completed by Paramount Pictures, with the co-operation of the Union Pacific and its officers, and will be released in April. The premiere showing will be held at Omaha on April 21, with a four day celebration from April 19-22. During this celebration the Union Pacific, from its president down through the ranks of its 5,000 employees in Omaha, is planning to return to the dress of 70 years ago. Just as Omaha was the "jumping off" place for those bound for the west in the pioneer '70s so also it will be a "stopping-off" place for travelers.

Cecil B. DeMille, the producer, and Barbara Stanwyck and Joel McCrea, the leading characters in the picture, will be present at Omaha. An historical pageant will be staged with DeMille and his film celebrities taking part. A "Pioneer Ball"

will be held at the Ak-Sar-Ben coliseum with a nationally known band supplying music. The U. P. train used in the movie and the U. P.'s new steam turbine locomotive will be exhibited. Presidents and officers of all railroads operating out of Omaha, as well as those of other western lines, magazine writers, news and newsreel photographers, radio commentators, columnists and drama and motion picture critics have been invited to attend.

The picture was filmed in two places, the studio in Hollywood and at Iron Springs, Utah, on the Union Pacific. Here the town of Cheyenne was reproduced with building fronts by Paramount, while the Union Pacific assembled old railroad equipment.

The picture shows two Baldwin eight-wheel locomotives, purchased by Paramount from the Virginia & Truckee; the "J. W. Bowker," borrowed from the Pacific Coast Chapter of the Railroad and Locomotive Historical Society and rechristened the "General Macpherson," and coaches, baggage cars, cabooses, blacksmith's cars, box cars, and tank cars, borrowed from the Union Pacific or purchased from the Virginia & Truckee and repainted in the characteristic yellow and green of the U. P. in 1869. There are 6,000 ft. of graded roadway on which a Union Pacific gang is laying hand hewn ties and 50-lb. rails under the direction of Charles Chamberlain, a division roadmaster assigned to the making of the picture by the U. P.

River Carriers Jittery at I. C. C.

(Continued from page 437)

the rail rates and destroy their competitive value. Cleveland Newton, of the Mississippi Valley Association, was opposed to

One Government Agency Which Understands Why Chaos Reigns In Transportation

In no field of national economy has there been a more complete lack of development according to plan than in transportation taken as a whole. At the present time the need for long-time planning is nowhere more pressing.

The railroads are close to the financial rocks; huge sums of public money are being spent, on highways, waterways, and air facilities, part of which might be saved if the different forms of transportation were properly geared together. National defense, which calls for the closest co-ordination of all transportation methods, is also being jeopardized.

There are five different methods of transportation: railroads, waterways, highways, air transportation, and pipe lines. Railroad transportation competes with all of the other forms, and most of them compete with one another. The initiative in planning for railroads and pipe lines lies with private companies, although a large share of the responsibility must be assumed by regulatory authorities which approve or disapprove of the plans made. For waterways, highways, and air transport facilities, however, the public undertakes promotional activities making these forms of

transportation more competitive and placing most of the responsibility for their planning directly on governmental agencies. This responsibility is divided between the state and national authorities, with leadership falling to the federal government, by virtue of its river and harbor projects, its grants-in-aid for highway construction, its maintenance of air navigation facilities, and prospective airport program.

With such division of authority and such lack of emphasis on planning in the regulatory agencies, it is not difficult to understand why the federal government has not formulated a national transportation policy and why it has not assumed the leadership in developing a national transportation system. The companies engaged in the different forms of transportation also being unable to work together to establish such a policy, there is much economic waste and destructive competition. Instead of being welded into a co-ordinated system, our various transport agencies are working more or less at cross purposes.

The federal government needs to encourage and undertake adequate transportation planning.

From the "Progress Report" of the National Resources Committee

any regulation of the inland waterway carriers. He derided the attempts of the railroads to convince the country that they were in financial straits, telling the committee that if one considered only the solvent roads, they made five per cent on their investment during 1937. He advocated "putting the insolvent ones through the wringer."

Chairman Bland said that he had asked Chairman Lea of the interstate and foreign commerce committee to request a joint congressional investigation of the entire transportation industry instead of having the report on the industry made by the President's committee-of-six. According to Chairman Bland, Mr. Lea did not favor this idea.

A letter from Commissioner Eastman of the I. C. C.'s legislative committee, was introduced into the record. The letter said that the commission favored regulation of water carriers under the I. C. C. and that it would be preferable to have planning, promotional or research work done by a transportation administrator or authority rather than by trying to coordinate the activities of both commissions through the use of a joint board composed of two members of each commission and one outsider. The letter went on to say that if the transportation authority idea and further extension of the I. C. C.'s power to water carriers is not enacted into law, the present Bland bill would improve the situation by enlarging the power of the Maritime Commission over water carriers.

Agri. Dept. Carries Ball for Truckers

(Continued from page 438)

complaints about the alleged effect of so-called "border wars" which rage despite reciprocity agreements between the states involved; and the variations in size and weight limitations. Weight restrictions, the report says, vary "from the 18,000 lb. authorized in Kentucky and Tennessee to the 120,000 lb. approved by Rhode Island. Significant from the standpoint of interstate commerce is the wide difference in permissible maximums authorized by pairs of contiguous states." Note is taken of the fact that by September 1, 1938, 14 states had adopted, for intrastate vehicles, the uniform safety and equipment standards set up by the Interstate Commerce Commission for interstate carriers; but still "state legislation having to do with size and weights continues to be a considerable hindrance to interstate commerce."

Appended to the press release on the report was a sort of bibliography, calling attention to various government publications bearing on the subject, and also to reports issued by other agencies including four put out by the National Highway Users Conference and one by American Trucking Associations, Inc.

On March 7 the National Highway Users Conference issued a statement accusing the railroads of engaging in "a nation-wide campaign for the enactment of

federal and state laws imposing excessive burdens on highway transportation." These "punitive" activities on the part of the railroads, the Conference stated, "are in direct violation of a Railroad-Highway User agreement that no legislation should be enacted which has for its purpose the stifling of any legitimate form of transportation." Further, the statement adds, "they have resulted in legislation of the kind condemned by Secretary of Agriculture Wallace" in the above-mentioned study.

While "continuing to adhere to the principles set forth in the Railroad-Highway User agreement, entered into by a committee of equal representation from each group," the Conference announced that "henceforth highway users will fight back, and they will undertake to expose all railroad schemes to 'equalize competition' by restricting the use of the highways, the effect of which would be to increase transportation costs to the public."

In the declaration of "new policy," the Conference made public a report approved by its Advisory Committee. Highway users are called upon in the report to utilize "every facility at their command to combat railroad propaganda and other activities directed against highway transportation."

"The most recent railroad anti-highway activity," the Conference asserts, "is to be found in a relief bill proposed to Congress by the railroads themselves containing many provisions penalizing their competitors. One highly objectionable feature of this railroad-sponsored legislation would transfer the Bureau of Public Roads, now in the Department of Agriculture, to a new board concerned chiefly with regulating the railroads, and whose powers would go so far as to determine what highways might be built."

Equipment and Supplies

FREIGHT CARS

SWIFT & COMPANY are inquiring for two tank cars of 40 tons' capacity for export.

THE ST. LOUIS-SOUTHWESTERN is inquiring for 100 underframes for flat cars.

THE CANADIAN NATIONAL will build in its own shops at Transcona, Man., 50 refrigerator cars to have steel underframes, steel superstructures and are to be steel plated. The company will also build 10 caboose cars in its shops at Moncton, N. B.; and 15 caboose cars in its shops at London, Ont.

THE CANADIAN NATIONAL has placed orders for 2,000 freight cars as follows: To the National Steel Car Company, 725 box cars; the Canadian Car & Foundry Co., Ltd., 650 box cars, and the Eastern Car Company, Ltd., 625 box cars. These cars are each of 40 tons' capacity. They

will be of steel-sheathed construction and will be equipped with all approved standard safety devices. Inquiry for this equipment was reported in the *Railway Age* of December 31, 1938, page 966.

LOCOMOTIVES

THE WABASH is inquiring for four 600-hp. Diesel-electric locomotives.

THE CHICAGO, ROCK ISLAND & PACIFIC, reported in the *Railway Age* of February 11 as inquiring for locomotive tenders, has placed an order for 11 tenders of 20,000 gal. capacity, with the American Locomotive Company.

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC has entered into lease-purchase contracts for six Diesel-electric switching locomotives, subject to the approval of the court. Two 1,000-hp. and two 600-hp. locomotives will be built by the Electro-Motive Corporation for use at Milwaukee, Wis., and two 600-hp. locomotives will be built by the American Locomotive Works for use at Cedar Rapids, Iowa.

PASSENGER CARS

THE CANADIAN NATIONAL has placed an order for five mail and express cars and 10 baggage cars with the Canadian Car & Foundry Co., Ltd.

IRON AND STEEL

NORFOLK & WESTERN.—The Virginia Bridge Company, Roanoke, Va., has received a contract for about 1,100 tons of steel for a bridge near Maybeury, W. Va.

SIGNALING

THE CHICAGO, ROCK ISLAND & PACIFIC.—Sealed proposals will be received at the office of the purchasing agent, 713 La Salle Street Station, Chicago, until 10:00 a. m. (c. s. t.), March 20, for furnishing miscellaneous signal material to be used in connection with federal aid grade crossing protection project in the State of Illinois.

MOBILE & OHIO.—Sealed proposals will be received by this road, W. J. Diehl, purchasing agent, Fullerton building, St. Louis, Mo., until 3:00 p. m., March 15, for furnishing certain material for automatic flashing light with short gate arm signal installation, project WPGM-54-C(1), at Main street, Union City, Tenn., under federal grade crossing program.

THE CHESAPEAKE WESTERN.—Sealed bids will be received by this road at 12 o'clock noon, March 11, for the necessary material for the installation of electric flashing light signals to be installed at Dayton, Va., under federal grade crossing project WPGM 595A of the State of Virginia. D. W. Thomas, president, Harrisonburg, Pa.

THE CHICAGO, ROCK ISLAND & PACIFIC has been authorized to install color-light

automatic block signals on the main line between Des Moines, Iowa, and Allerton. Work was started on February 23 and it is planned to have this section of 75 miles in operation by May 1. Work is also underway in installing this system between El Reno, Okla., and Oklahoma City, a distance of 22 miles, with completion set for March 15. A section of color-light signaling was completed last year on the main line, which with installations between Bureau, Ill., and Peoria; between Manly, Iowa, and Newport, Minn.; and that portion of the main line in Colorado, will give the Rock Island a total of 1,500 miles of automatic block signaling.

SEABOARD AIR LINE.—Sealed proposals will be received at the office of J. L. Brown, purchasing agent, Norfolk, Va., until 2:00 p. m., March 28, for furnishing the necessary materials for four crossing installations of automatic flashing light signals to be installed under the federal grade crossing program in the State of North Carolina.

UNION PACIFIC.—Sealed proposals will be received at the office of E. L. Fries, general purchasing agent of this road, Omaha, Nebraska, until 12 o'clock noon, (c. s. t.) March 15, for furnishing the necessary materials for nine or more railroad grade crossing protective devices; these are to be installed under the federal grade crossing program in the State of Utah.

SALT LAKE, GARFIELD & WESTERN.—Sealed bids will be received by this road, 22 East 1st South street, Salt Lake City, Utah, until 2:00 p. m., March 24, for the installation of one electric flashing highway crossing signal to be installed in the State of Utah under federal grade crossing projects. Further information may be obtained from I. E. Maxwell, superintendent.

ALABAMA GREAT SOUTHERN.—Sealed proposals will be received by this road, Washington, D. C., until 2:00 p. m., March 21, for furnishing the necessary materials for the installation of a flashing-light crossing signal at East 23rd street, Chattanooga, Tenn. Further information may be obtained from L. H. Skinner, general purchasing agent, Southern Railway System, Washington.

SALT LAKE & UTAH.—Sealed proposals will be received in the office of Helen B. Keating, purchasing agent of this road, Terminal building, Salt Lake City, Utah, until 12:00 o'clock noon, (mountain standard time), March 17, for furnishing the necessary materials for five railroad grade crossing protective devices, (flashing or protecting signals), to be installed under federal grade crossing program in the State of Utah.

MARYLAND.—Sealed proposals will be received by the State Roads Commission, Federal Reserve Bank building, Calvert and Lexington streets, Baltimore, Md., until 12 o'clock noon, March 13, for furnishing and delivering signal materials for the installation of flashing-light type highway

crossing signals at Earleigh Heights, Md., at Robinson, at Pasadena, and at Elvaton. Contracts AA-264-343 to 267-343 inclusive, Federal Aid Projects No. F.A.S.-27-A, 28-A, 38-A and 39-A. J. Glenn Beall, is chairman, and L. H. Steuart, secretary.

Supply Trade

Fairbanks, Morse & Company

The annual report of Fairbanks, Morse & Company shows a net profit of \$558,539 for 1938, as compared with \$2,148,431 for 1937. Sales for the year amounted to \$20,957,451 as compared with \$30,596,349 in 1937. Total current assets of the company amounted to \$16,396,576 and current liabilities to \$2,153,286. Notice was given preferred stockholders on September 10, 1938 of the intention to recall for redemption the preferred shares of the company outstanding on November 15, 1938. Of the 10,958 shares then outstanding, 428 shares were presented for conversion at the rate of $2\frac{1}{2}$ common shares for 1 preferred share, and the remaining 10,530 shares were redeemed at \$105 per share plus accrued dividends. The manufacturing of home appliances was discontinued late in 1938. Ample reserves have been provided in 1938 operations to cover the cost of the company's withdrawal from this field.

Westinghouse Electric & Manufacturing Annual Report

The Westinghouse Electric & Manufacturing Co., according to its annual report for the year ended December 31, 1938, earned a net income during the year of \$9,052,773, equivalent, after preferred dividends, to \$3.38 a share earned on the 2,592,155 shares of common stock outstanding. This compares with a net of \$20,126,408 earned during 1937, equal after preferred dividends to \$7.66 a share on the common.

Orders received during 1938 amounted to \$149,662,776, compared with \$229,540,061 in the previous year, a decrease of 35 per cent. Sales billed during the year totaled \$157,953,216, compared with \$206,348,307 in 1937, a decrease of 23 per cent. Unfilled orders on hand on December 31, 1938, were \$40,188,150, compared with \$60,298,087 at the end of the previous year, a decrease of 33 per cent. In their reports to the stockholders, A. W. Robertson, chairman, and G. H. Bucher, president, declared, "As this report goes to press, there are definite signs of an improvement in business. We expect the improvement to continue during the year." They also pointed out that the sales volume in the export field increased slightly during the year.

Edward G. Budd Manufacturing Company Annual Report

The annual report of the Edward G. Budd Manufacturing Company for the year ended December 31, 1938, shows a net loss of \$1,482,442, after deduction for all charges and taxes, compared with a

net profit of \$1,219,423 in 1937. However the upturn of business near the end of the year brought a profit during the fourth quarter of \$94,586 including year-end adjustments. The operations of the Budd Wheel Company during 1938 showed a loss of \$460,670, compared with a profit of \$618,991 in 1937. The company showed a profit of \$127,575 for the fourth quarter including year-end adjustments.

In his letter to stockholders concerning 1938, Mr. Budd, president of both companies, attributed the lack of profit to low volume of both automobile and railroad equipment sales. Among the new developments which the companies have been pushing he mentioned the fact that a new type of railroad brake which expands inside the wheel on the axle has been brought to the point of commercial application and is now being installed on a train being built for the Chicago, Burlington & Quincy.

Safety Car Heating & Lighting Annual Report

The annual report of the Safety Car Heating & Lighting Co., for the year ended December 31, 1938, shows a net profit for the year of \$127,995, compared with \$1,561,174 in 1937. Dividends of \$2 per share were paid during the year on 94,026 shares of capital stock outstanding, which compares with a \$10 dividend paid during 1937. The earned surplus as of December 31, 1938, was \$1,078,328. W. L. Conwell, president, in his statement to stockholders, indicates that the company has been improving its products through research and development and is in a position to participate in any business improvement. While no general buying movement is in evidence, he observes that "there has been a gratifying pick-up in orders received since January first of this year."

American Locomotive Company Annual Report

The annual report of the American Locomotive Company and subsidiary companies for the year ended December 31, 1938, shows a consolidated net loss for the year of \$1,302,195, as compared with a net profit of \$6,113,218 for 1937. Gross sales during 1938 amounted to \$24,272,076 as compared with \$50,447,450 in the preceding year.

In his report to stockholders, William C. Dickerman, president, points out that while there was a considerable drop in orders for steam locomotives during the year, the Diesel division and Alco Products division (the latter is engaged in the sales and manufacture of oil-refinery equipment) enjoyed an increased volume of business. Unfilled orders of the entire company as of December 31, 1938, aggregated approximately \$6,700,000, as compared with \$10,500,000 one year preceding. To simplify corporate structure, the activities of the Canadian Steel-Tire & Wheel Co., Ltd., Montreal, Que., a wholly-owned subsidiary engaged in the manufacture of steel tires and steel-tired wheels for all classes of railroad service were merged, with the Montreal Locomotive Works, Ltd., Montreal, also a wholly-owned subsidiary, as of December 31, 1938.

William J. Roehl, Inc., has been appointed representative for **Templeton, Kenly & Co.**, Chicago, for the St. Louis, Mo., territory.

The wrench division of the **Bemis & Call Co.**, has been acquired by the **Billings & Spencer Co.**, Hartford, Conn., and all wrench products formerly produced by Bemis & Call will be produced and shipped from the Billings & Spencer Hartford plant.

The Gulf Tractor & Equipment Co., Houston, Tex., has been appointed representative in that territory for the Bucyrus-Erie Company.

Malcolm W. Reed, vice-president in charge of operations of the American Steel & Wire Co., has been appointed chief engineer of the **Carnegie-Illinois Steel Corporation**, to succeed **Sydney Dillon**, who has been moved to the office of the chief engineer of the United States Steel Corporation.

E. K. Goldschmidt, representative at Philadelphia, Pa., of **The Safety Car Heating and Lighting Company**, will be transferred to its western district, with headquarters at Chicago, effective March 15. **R. L. Hillpot** and **Pearce Whetstone** were appointed representatives for the company, with headquarters at Philadelphia, effective March 1.

The International Harvester Company is rehabilitating and rearranging its tractor works at Chicago. The changes were begun last year with the construction of a \$1,000,000 factory addition for the manufacture of crawler-type tractors. About \$800,000 will be spent this year for the purchase of new machinery, the rehabilitation of existing machinery, and the rearrangement of the entire plant to obtain greater plant capacity and manufacturing efficiency. A total of \$1,200,000 will be spent next year in completing the plant modernization program.

A. K. Hohmyer, assistant western manager of the **Westinghouse Air**



A. K. Hohmyer

Brake Company, at Chicago, has been promoted to western manager, succeeding

C. D. Foltz, who has retired after 29 years continuous service. **H. H. Burns**, mechanical expert for the company at St. Louis, Mo., has retired after 33 years continuous service.

A. K. Hohmyer entered the employ of



C. D. Foltz

the Westinghouse Air Brake Company in 1901 as a clerk in the general office at Wilmerding, Pa. He was transferred to the Chicago office in 1909; was appointed representative in 1913 and served as assistant western manager from 1920 to 1922. For the next six years he was associated with another company, but in 1928 Mr. Hohmyer returned to his former position which he held until his recent promotion.

C. D. Foltz, before entering the employ of the Westinghouse Air Brake Company in 1910, was connected with the railroad business for many years. Beginning work at the age of 15 years as a telegraph operator, he successively served as fireman, engineman and travelling engineer with various midwestern roads. His positions with the Air Brake Company have been: Mechanical expert and representative at Salt Lake City, Utah, and Denver, Colo., assistant western manager at Chicago and then as western manager which position he has held continuously from 1928 until his retirement.

H. H. Burns, mechanical expert at St. Louis, Mo., who has retired from active duty first served for several years as a locomotive engineman and as an instructor for the International Correspondence Schools. He entered the employ of the Westinghouse Air Brake Company in 1906, as assistant instructor on the instruction car and was in full charge from 1909 to 1913, when he was promoted to mechanical expert, the position he held until his retirement.

Gilbert E. Webster, whose appointment as sales manager of the track spring washer department of the **National Lock Washer Company**, with headquarters at Newark, N. J., was announced in the *Railway Age* of February 25, was born on November 23, 1900, at Odon, Ind. He was educated at the high school in Champaign, Ill., and attended military school at Mexico, Mo. Mr. Webster began his business career in 1918 with the Illinois Central,

serving consecutively as clerk, statistician and chief clerk on the Illinois division of that road until 1922. From 1923 to 1938, he was associated with the P. & M. Com-



Gilbert E. Webster

pany as foundry sales representative and southwestern sales agent and during part of this time he was also associated with the southwestern sales representative of the National Lock Washer Company.

OBITUARY

Cornell S. Hawley, president of the Consolidated Car-Heating Company, Inc., Albany, N. Y., died on February 26, at his home in Albany, at the age of 70 years.

Emanuel J. Block, vice-president and a director of the Inland Steel Company, Chicago, died of a heart attack at Phoenix, Ariz., on March 5. Mr. Block was born



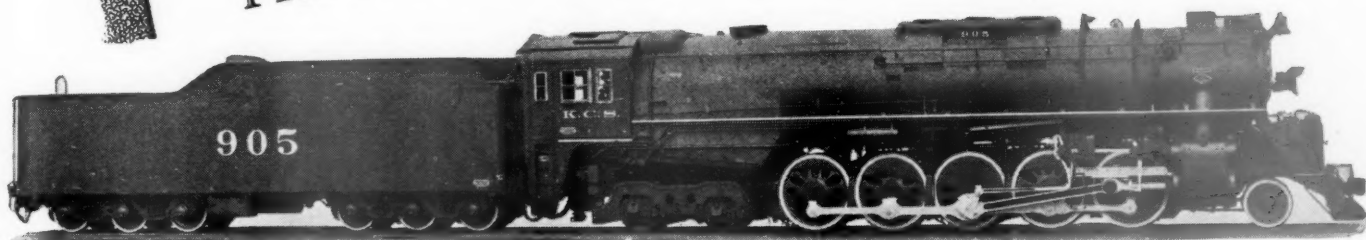
Emanuel J. Block

at Cincinnati, Ohio on May 22, 1880, and since 1901 has been identified with steel manufacturing. In this year he entered the employ of the Inland Steel Company, and during his 38 years service with that company held positions in various departments, including that of assistant secretary and assistant treasurer. For a number of years he had been in charge of the company's purchasing.

Continued on next left-hand page

LIMA POWER AT WORK

KANSAS CITY SOUTHERN
PROFITS FROM NEW POWER



"Kansas City Southern Railway in 1938 effectively demonstrated the use of new equipment in reducing unit costs at a greater rate than the fall in total volume of business. Figures for this road show that while there was a drop of $8\frac{1}{2}\%$ in the volume of freight business in 1938 as compared with 1937, there was a reduction in the unit costs, as measured by 1,000 gross ton miles, of 11% . **** This was mainly brought about by the thorough application of new high-speed freight locomotives, delivered over 1937, and their use in hauling 40-car and 50-car trains at high speed instead of 30-car trains."

Reprinted from Wall Street Journal
March 2, 1939

During 1937 Lima Locomotive Works, Incorporated delivered a group of modern 2-10-4 type locomotives to the Kansas City Southern.

Modern power is *earning* power.

LIMA LOCOMOTIVE WORKS,



INCORPORATED, LIMA, OHIO

Financial

ATCHISON, TOPEKA & SANTA FE.—Abandonment.—The Interstate Commerce Commission, Division 4, has authorized this company to abandon (a) the line known as the Naphtha District, extending from milepost 0 at the station of Hickman Junction, Okla., to milepost 6 plus 2561 ft., and (b) the line known as the De Noya District, extending from the milepost 0 at the station of Naphtha Junction, Okla., to milepost 2 plus 4399 ft., a total distance of approximately 9.3 miles.

BOSTON & MAINE.—Abandonment.—This company has been authorized by Division 4 of the Interstate Commerce Commission to abandon that part of its so-called Milford branch extending from Pepperell Station, Mass., to a point near South Milford station in Milford, N. H., 13 miles.

CHICAGO & NORTH WESTERN.—Abandonment.—The Interstate Commerce Commission, Division 4, has authorized this company to abandon a line extending from Bain, Wis., westerly and southwesterly to a point near Harvard, Ill., 39.4 miles.

The commission has also authorized this company to abandon that portion of its Galena branch extending from Hazel Green Junction, Ill., to Galena, 10 miles.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—Reorganization.—The Interstate Commerce Commission has set April 12 as the date for oral argument before the

full commission on plans for the reorganization of this company under section 77 of the Bankruptcy Act.

GULF, MOBILE & OHIO.—Hearing Set on Merger Plan.—Public hearings on the application of this company and the Gulf, Mobile & Northern to acquire the property of the Mobile & Ohio and merge the property of the Gulf, Mobile & Northern will be held before Examiners Molster and Howard of the Interstate Commerce Commission in Washington, D. C., on April 4.

LEHIGH VALLEY.—Assumption of Liability and R. F. C. Loan.—In connection with this company's interest deferment plan, approval of which by the Interstate Commerce Commission was noted in last week's issue, the commission has modified its order of December 14, 1937, so as to permit the continuation of the assumption of liability, as guarantor and endorser, by this company, for the payment of principal, interest, and minimum sinking fund requirements of \$4,117,500 of five year secured six per cent notes of the Lehigh Valley Coal Company, as modified by a proposed plan and deposit agreement for the adjustment of the finances of the coal company, when and if such a plan and agreement becomes effective.

The commission has also found that the Lehigh Valley is not in need of financial reorganization if its interest deferment plan becomes effective, and has conditionally approved an extension of the time of payment to November 1, 1943, of a loan of \$778,000 to the company by the Reconstruction Finance Corporation, maturing

April 30, 1941. Chairman Caskie and Commissioner Eastman dissented, and Commissioner Aitchison did not participate in the disposition of the case. The dissents were only noted, and no reasons were given.

NEW YORK, SUSQUEHANNA & WESTERN.—Reorganization Hearing Postponed.—The Interstate Commerce Commission, Division 4, has postponed from March 7, to March 20, the date for public hearings in Washington, D. C., on this company's reorganization plan. Examiner C. A. Bernhard will preside.

PITTSBURGH & WEST VIRGINIA.—R. F. C. Loan Extension.—This company has asked the Interstate Commerce Commission to approve an extension for three years of Reconstruction Finance Corporation loans totaling \$4,216,607 which matured December 31, 1938. The loans are being carried as past due, but not in default, pending action by the commission on a proposed R. F. C. loan of \$7,500,000 which would be used by the railroad to consolidate all of its outstanding bank and R. F. C. loans.

PITTSBURGH & WEST VIRGINIA.—Notes.—This company has asked the Interstate Commerce Commission, in an amended application, for approval of Reconstruction Finance Corporation assistance in financing an issue of \$7,095,000 of promissory notes, the proceeds to be used to consolidate in one sum outstanding RFC and bank loans of the road.

The company's prior application had

NORFOLK AND WESTERN RAILWAY COMPANY

Summary of Forty-third Annual Report for 1938

Results for the Year

	1938	Comparison with 1937
Total Revenue from Operations.....	\$77,162,941.67	Dec. \$17,698,561.32
Total Operating Expenses.....	46,370,718.81	Dec. 6,736,603.25
Net Revenue from Operations.....	\$30,792,222.86	Dec. \$10,961,958.07
Federal, State and Local Taxes.....	\$11,485,030.06	Dec. \$1,550,483.45
Net Rental of Equipment and Joint Facilities—Credit	2,415,095.51	Dec. 1,581,518.67
Net Railway Operating Income.....	\$21,722,288.31	Dec. \$10,992,993.29
Other Income.....	1,042,269.32	Dec. 513,755.63
Gross Income from all sources.....	\$22,764,557.63	Dec. \$11,506,748.92
Interest on bonds and other charges.	\$2,750,871.08	Inc. \$278,845.76
Net Income.....	\$20,013,686.55	Dec. \$11,785,594.68

The decrease in Total Revenue from Operations for 1938 was due to the depressed condition of business, particularly in the first half of the year. Taxes decreased chiefly because of reduction in net earnings.

After paying the regular 4% dividend of \$916,500 upon Adjustment Preferred Stock, quarterly dividends of \$2.50 per share, a total of \$10.00, or \$14,064,830, were paid upon Common Stock during 1938.

Financial

The outstanding capital stock was \$163,532,800, and represented 75.86 per cent of capitalization. On December 31, 1938, the Company's stockholders numbered 13,324, an increase of 162 during the year, with an average holding of 123 shares.

The outstanding funded debt was \$52,030,532, and represented

24.14 per cent of capitalization. Securities in the voluntary sinking fund for retirement of funded debt had a par value of \$216,800, and a market value of \$248,018.

Railway Property Investment

The Total Railway Property Investment was \$502,573,144, an increase of \$446,359 over 1937. The Net Railway Operating Income for 1938 was \$21,722,288, and represented a return of 4.32 per cent for the year on the Railway Property Investment.

New Equipment

During the year the Company built, in its shops at Roanoke, Va., eight steam locomotives, and purchased 13 automobiles. Seven passenger train cars were rebuilt and air-conditioned, making a total of 125 air-conditioned cars in service.

Transportation Rates

In March, 1938, the Interstate Commerce Commission made a partial grant of freight rate increases requested by Class I Railroads, but refused any further increases in bituminous coal rates. The effect of these increases on the revenues of the Company was inconsequential. In July, 1938, the Commission authorized carriers in the Eastern territory and in the Pocahontas region, to increase passenger coach fares from 2 cents to 2½ cents per mile, to remain in effect for eighteen months.

Increases in freight rates on bituminous coal and coke, which had been granted by the Commission for the period from November 15, 1937, to December 31, 1938, were extended without limitation by order issued November 30, 1938.

By order of the Board of Directors,

W. J. JENKS,
President.

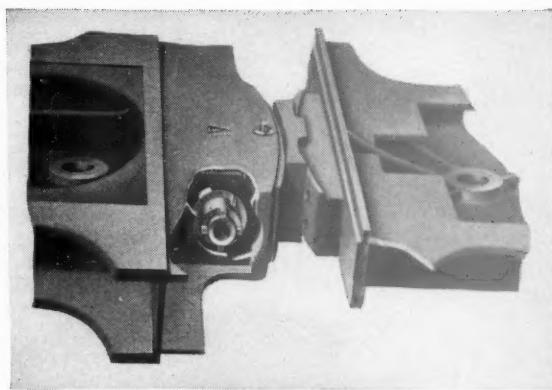
[Advertisement]

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89%

of the steam locomotives built in 1938 HAVE FRANKLIN E-2 RADIAL BUFFERS

89% of the steam locomotives built during 1938 for use in the United States are assured of easier riding and greater safety. Slack between engine and tender is eliminated by the application of the Franklin E-2 Radial Buffer, thus absolutely removing one of the principal causes of hard riding. » » » The Franklin E-2 Radial Buffer quickly pays for itself . . . in economy . . . in safety . . . in increased passenger comfort . . . and in lower maintenance.



FRANKLIN RAILWAY SUPPLY COMPANY, INC.

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sought an outright loan from the RFC in the amount of \$7,500,000 for the same purpose. In the amended application the amount of proposed RFC aid was reduced by eliminating a sum of \$383,845 which was to provide the carrier with additional cash and by eliminating additional amounts which have been paid on the principal of bank loans since the original application was filed.

The proceeds of the note sale are to be used as follows: \$4,216,607 for the payment of principal of four outstanding RFC loans; \$2,873,393 with additional cash available, for the payment of principal of all outstanding bank loans.

ST. LOUIS SOUTHWESTERN.—Reorganization.—The Interstate Commerce Commission has denied a request by Walter E. Meyer for a postponement of four months of a hearing now assigned for April 12 on his charges with respect to the effect upon the finances, earnings, and assets of this company of control by the Southern Pacific. The commission also refused to grant Mr. Meyer's request that the Southern Pacific be called upon to produce specified information relating to his charges.

The commission has recently opened the Cotton Belt reorganization case in order to investigate charges of Mr. Meyer, a former director of the road, that the Southern Pacific had neglected the carrier and had violated its fiduciary relationship, thereby contributing to its bankruptcy.

SOUTHERN.—Abandonment.—The Interstate Commerce Commission, Division 4, has authorized this company to abandon a branch line extending from a connection with its Columbia-Greenville line at Hodges, S. C., to Abbeville, 11.6 miles.

TEXAS & PACIFIC.—Bonds.—This company has asked the Interstate Commerce Commission for authority to issue and place in its treasury \$3,270,000 of general and refunding mortgage five per cent bonds, series D, issuable under the general and refunding mortgage dated January 1, 1924, and to pledge these bonds, together with \$6,730,000 of Series D bonds, presently in its treasury, as collateral security for short-term notes for a period of not to exceed five years.

WABASH.—RFC Loan.—This company has asked the Interstate Commerce Commission to approve a \$7,500,000 Reconstruction Finance Corporation loan to it, the proceeds to be used to pay off outstanding equipment trust obligations. The loan would be secured by 2½ per cent promissory notes with Wabash equipment as collateral for the notes.

The company had previously obtained a bid of par on a proposed issue of 3½ per cent equipment trust certificates which were to be used to consolidate outstanding obligations. This offer expired on March 1, and was rejected by the court handling the receivership. The court directed the company to accept an RFC offer to provide the money at 2½ per cent.

Dividends Declared

New York, Lackawanna & Western. — \$1.25, quarterly, payable April 1 to holders of record March 10.

Reading Co.—Preferred, 50¢, quarterly, April 13 to holders of record March 23.

St. Joseph, South Bend & Southern.—Irregular, 75¢; 5 Per Cent Preferred, \$2.50, semi-annually, both payable March 20 to holders of record March 10.

Southern.—Mobile & Ohio.—\$2.00, semi-annually, payable April 1 to holders of record March 15.

Average Prices of Stocks and Bonds

	Mar. 7	Last week	Last year
Average price of 20 representative railway stocks..	33.25	32.69	28.45
Average price of 20 representative railway bonds..	63.41	62.59	61.94

Construction

ATCHISON, TOPEKA & SANTA FE.—A contract has been awarded Cook and Ransom, Ottawa, Kan., for work on a nine-mile change of line on this road at San Marcial, N. M., involving 650,000 cu. yd. of grading, the construction of 16 pile trestles and 29 creosoted wood box culverts and the placing of culvert pipe at 11 locations.

ATCHISON, TOPEKA & SANTA FE.—A contract amounting to approximately \$117,800 has been awarded the United Concrete Pipe Corporation, Los Angeles, Cal., by the State of California Department of Public Works for the construction of a steel deck girder span on reinforced concrete abutments for one existing and one future track of the Santa Fe over Rosemead Boulevard, Los Angeles. The structure alone will cost about \$54,000, and railroad work to be done in connection with this project will cost about \$9,000.

NORFOLK & WESTERN.—Contracts have been awarded for the construction of a new double track steel bridge, 475 ft. long and 130 ft. high, to be built about three-quarters of a mile east of Maybeury, W. Va., 30 ft. south of the present bridge No. 859, at a cost of \$250,000. The Walton Sudduth Company, Bluefield, was the low bidder on the masonry work and the Virginia Bridge Company, Roanoke, Va., was awarded the contract for the erection of the steel work and dismantling of the present bridge. The project requires the use of about 1,100 tons of steel and 1,200 cu. yd. of concrete. It will be necessary to make about 1,700 cu. yd. of foundation excavation.

READING.—The Golder Construction Company, Inc., Philadelphia, Pa., has been given a contract for the construction of a passenger station at 22nd street and Allegheny avenue and for a freight station at 21st street and Allegheny, to cost \$97,860. This work is being carried out in connection with the elimination of grade crossings at Allegheny avenue and 21st and 22nd streets, Philadelphia.

The Reading also let contracts to Young Brothers, Inc., Philadelphia, for grading and masonry and to the American Bridge Company for steel superstructure in connection with the reconstruction of Bridge No. 10/75 on the line of Greenwood avenue, south of Jenkintown, Pa., to cost about \$59,496.

Railway Officers

EXECUTIVE

Charles H. Jones, general manager of the Chicago, South Shore & South Bend, with headquarters at Michigan City, Ind., has been elected also vice-president.

Thomas Hart Pindell, chairman of the board and former president of the Alton & Southern, has retired after 65 years active railroad service. Mr. Pindell was elected chairman of the board in July, 1938, at which time a biographical sketch of his railroad career, accompanied by a photograph, was published in the *Railway Age* of July 16.

FINANCIAL, LEGAL AND ACCOUNTING

V. Lopez Espino has been appointed acting comptroller and general auditor of the National Railways of Mexico, with headquarters at Mexico, D. F., succeeding **I. J. Terroba**.

Edward H. Utley, Jr., general auditor of the Chicago, South Shore & South Bend, has been appointed comptroller, a newly created position, with headquarters as before at Michigan City, Ind., and **E. H. Bros**, has been appointed auditor, with the same headquarters.

Adam Haug, who has been appointed an assistant comptroller of the New York Central system at New York, as noted in the *Railway Age* of March 4, was born at Buffalo, N. Y. He entered railroad service with the New York Central & Hudson River (now New York Central) at Buffalo in April, 1904, in the office of the resident engineer, and served as chairman on the engineering corps. Mr. Haug was later employed as stenographer and clerk and in November, 1906, was transferred to New York as stenographer in the office of the chief engineer. In 1907 he returned to Buffalo as stenographer and clerk to resident engineer on the Belt Line grade crossing elimination and in November of that year he was transferred to the Boston & Albany at Boston, Mass., as secretary and clerk in the engineering and maintenance of way department. On October 1, 1910, Mr. Haug was appointed engineering and maintenance of way accountant and on February 1, 1914, was appointed valuation accountant. In December, 1917, he became statistical clerk in the office of the vice-president and in October, 1918, statistician in the office of the federal manager. On March 1, 1920, Mr. Haug was appointed auditor of the Boston & Albany and continued in that capacity until his recent appointment as assistant comptroller of the New York Central system.

OPERATING

B. R. Gould, assistant terminal trainmaster, Chesapeake & Ohio, has been ap-

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NO. 84 OF A SERIES OF FAMOUS ARCHES OF THE WORLD



Photo by Fratelli Alinari—from "Bridges" by Charles S. Whitney—Published 1929 by William E. Rudge.

ROMAN BRIDGE AT PONT S. MARTIN ITALY

Many bridges of the Romans have survived the centuries and they all reflect the discipline and morale of the workmen that prevailed under the Empire. Such permanent structures resulted from faith in the permanence of the Roman Empire, and when this faith changed there was a marked decrease in the quality of workmanship of the bridges. This Roman Bridge at Pont S. Martin, Italy, is one of the better examples of Roman architecture that was prevalent prior to the decline of the Roman Empire. » » » The American

Arch Company, too, was a pioneer. But, unlike the Roman bridge builders, their work has maintained its original rigid standards. The Security Sectional Arch, which was introduced 28 years ago, is today the standard on American railroads. To realize the full economy of your Sectional Arch, and to insure yourself against waste incurred from partially consumed fuel, make sure each locomotive leaves the roundhouse with a complete arch.

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pointed terminal trainmaster at Waldrige, Ohio, succeeding **F. I. Stump**, who died on February 19.

F. H. Hibbard, acting superintendent and chief engineer of the Quebec Central, with headquarters at Sherbrooke, Que., has been appointed superintendent and chief engineer, with the same headquarters. Mr. Hibbard will have jurisdiction over all branches of operating service, including maintenance of way, motive power and car departments and highway motor coach services.

B. C. Murphy, who has been on a leave of absence because of illness, has been appointed trainmaster of all districts on the Joplin and White River divisions of the Missouri Pacific, with headquarters at Nevada, Mo., replacing **C. A. Hughes**, who has been transferred to the Northern Kansas division, with headquarters at Concordia, Kan. Mr. Hughes relieves **F. E. Bromley**, who has been transferred to Nevada succeeding **S. F. Ayler**.

William A. Wood, general superintendent of the New York, Ontario & Western, with headquarters at Middletown, N. Y., has been appointed general manager, reporting to the trustee. The position of general superintendent has been abolished. **Francis X. Soete** will continue as purchasing agent, with entire charge of purchases and stores. The position of assistant general superintendent, also held by Mr. Soete, has been abolished. A biographical sketch of Mr. Wood's career was published in the *Railway Age* of May 28, 1938, in connection with his appointment as general superintendent.

A. T. Berg, whose promotion to superintendent of the Chicago Terminal division of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, was announced in the *Railway Age* of March 4, is a native of Chicago and entered service with the Milwaukee as a section lab-



A. T. Berg

orer in 1912. In 1917, he transferred to train service as a brakeman and later engaged in clerical work at Milwaukee, Wis., becoming a station master at that point. In 1925 Mr. Berg was promoted to train master, with headquarters at Milwaukee, and in July, 1933, he was advanced to assistant superintendent of the Chicago

Terminal division, the position he held at the time of his recent promotion.

G. E. Donnatin, whose appointment as superintendent of the Los Angeles Union Passenger Terminal, with headquarters at Los Angeles, Cal., was announced in the *Railway Age* of March 4, was born at Los Angeles on February 1, 1888, and entered railway service on May 1, 1907, as a locomotive fireman on the Los Angeles division of the Southern Pacific. On May 1, 1912, he became a freight brakeman, and four years later he was promoted to conductor. On November 1, 1918, he was advanced to yardmaster, and on December 1, 1922, he was promoted to trainmaster. Mr. Donnatin was further advanced to terminal trainmaster, with headquarters at Los Angeles, on July 1, 1923, the position he held at the time of his recent promotion.

F. A. Clifford, special assistant to the general manager of the Missouri Pacific at St. Louis, Mo., has been promoted to superintendent of stations and claim pre-



F. A. Clifford

vention, with the same headquarters, succeeding **Thomas F. Scruby**, who retired on March 1.

Mr. Clifford was born in Alton, Ill., and entered the service of the Missouri Pacific in 1904, in the station accounts department, later becoming a traveling auditor. In 1911, he was placed in charge of station accounts in the general office at St. Louis and in 1916, he was promoted to special assistant to the general manager. He was advanced to superintendent of station service in June, 1924, and in September, 1925, when the offices of superintendent of claim prevention and superintendent of station service were consolidated, he was appointed assistant superintendent of stations and claim prevention. Mr. Clifford was appointed special assistant to the general manager on May 16, 1929.

Mr. Scruby entered railway service in 1885, with the Chicago & Alton (now the Alton) and two years later went with the Missouri Pacific as a night operator at Corning, Kan. He served as agent, operator and clerk at various points until 1910, when he was promoted to traveling freight agent, with headquarters at Wichita, Kan. He was appointed traveling car agent in 1916, and in 1919, he was advanced to claim

assistant and general superintendent of offices. Later in 1919, he was appointed supervisor of claim prevention. In September, 1925, Mr. Scruby was promoted to superintendent of stations and claim prevention.

TRAFFIC

W. J. Ubben, assistant to traffic manager of the Alton & Southern, has been promoted to assistant traffic manager, with headquarters as before at St. Louis, Mo.

Arthur Mitchell has been appointed general agent for the Chicago, Attica & Southern, with headquarters at Washington, D. C.

Charles F. Matlin has been appointed assistant general freight agent for the Missouri & Arkansas, with headquarters at Los Angeles, Cal., a newly created position.

B. F. Rice, acting general coal and coke freight agent of the Wabash, has been appointed general coal and coke freight agent, with headquarters as before at St. Louis, Mo.

L. S. Pritchett has been appointed district freight agent of the Baltimore & Ohio at Philadelphia, succeeding **E. T. Hoffman**, who succeeds **W. M. Randall**, with the same title and headquarters.

L. P. Nash, assistant general freight agent on the St. Louis-San Francisco, with headquarters at Atlanta, Ga., has retired after 25 years service and the position has been abolished.

Earl O'Donnell, traffic agent for the Chicago Great Western at Seattle, Wash., has been promoted to general agent at Philadelphia, Pa., replacing **G. L. Springer**, resigned.

F. Alatorre, convention director for the National Railways of Mexico at Chicago, Ill., has been promoted to general agent at San Antonio, Tex., a newly created position.

F. C. Nessly, general western agent of the Minneapolis, Northfield & Southern, has been appointed assistant general freight agent, a change in title, with headquarters as before at Seattle, Wash.

James E. Clark, assistant general freight agent of the Pere Marquette with headquarters at Buffalo, N. Y., retired on February 1, after nearly 55 years of continuous service with this company and its predecessor.

J. S. Mason, traveling freight and passenger agent on the Wabash, with headquarters at New Orleans, La., has been appointed acting general agent at that point succeeding **J. M. Cousins**, who has taken a leave of absence because of illness.

C. L. Gaffney, traveling freight agent for the Chicago, Burlington & Quincy, with headquarters at Boston, Mass., has been promoted to general agent at that point, succeeding **F. F. Johnson**, who retired on March 1.

W. H. Goodner, commercial agent of

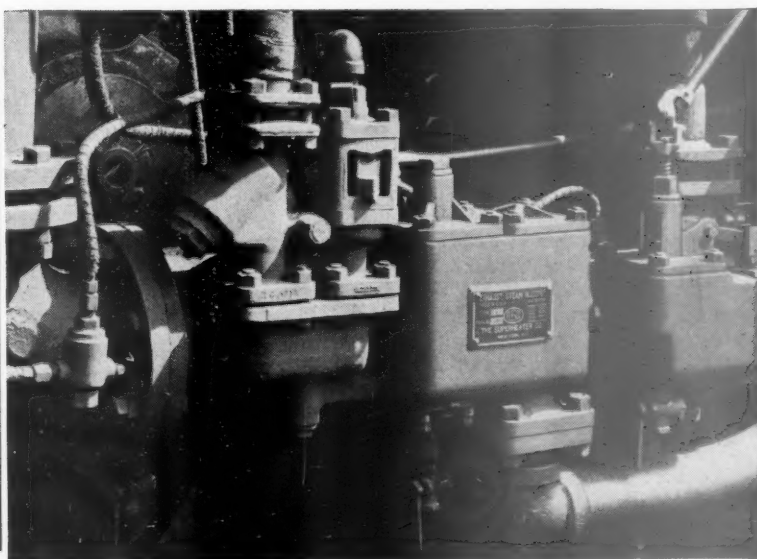
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The Elesco Exhaust Steam Injector:

1. Reduces fuel and water consumption 8%-12%, or provides an equivalent increase in the capacity of the boiler.
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the Northeast Oklahoma, with headquarters at Miami, Okla., has been promoted to traffic manager and claim agent, with the same headquarters, succeeding **J. L. Cooper**, who has retired.

J. W. Prescott, traveling freight and passenger agent on the Texas & Pacific, with headquarters at Oklahoma City, Okla., has been promoted to general agent at that point succeeding **Marvin C. Bailey**, deceased.

Van A. Ferry, chief clerk in the traffic department of the Union Pacific at Gering, Neb., has been appointed acting general agent at that point, succeeding **S. C. Clarke**, who has been promoted to special representative of the president, with headquarters at Omaha, Neb.

M. A. Calhoun, acting assistant general freight agent of the Seaboard Air Line, with headquarters at Savannah, Ga., has been appointed assistant general freight agent there, succeeding **H. G. Glaiber**, who, on account of the state of his health, has been assigned to other duties.

W. E. Meuse, division passenger agent on the Baltimore & Ohio, with headquarters at Pittsburgh, Pa., has been promoted to assistant general passenger agent on the Alton, with headquarters at Chicago, succeeding **Charles C. Elrick**, whose death on January 16, was announced in the *Railway Age* of January 21.

W. E. Sinclair, commercial agent on the Chicago, Milwaukee, St. Paul & Pacific, at Minneapolis, Minn., has been promoted to general agent at that point, a newly created position and **D. M. McGeen**, commercial agent at St. Paul, Minn., has been promoted to general agent at that point, also a newly created position.

N. J. Conboy, assistant general agent for the Texas & Pacific at Pittsburgh, Pa., has been promoted to general agent at that point, succeeding **H. A. Lowry**, who has been transferred to St. Louis, Mo., replacing **G. L. Moore**, whose death on January 30, was announced in the *Railway Age* of February 11.

Ralph J. Hanson has been appointed freight traffic manager in charge of solicitation of the Akron, Canton & Youngstown and the Northern Ohio, with headquarters at Akron, Ohio. **J. J. King**, freight traffic manager, with the same headquarters, will continue in that capacity with supervision chiefly over rates and tariffs.

B. F. McCoy, formerly general agent for the Fort Smith & Western, with headquarters at Detroit, Mich., has been appointed general agent for the Chicago, Springfield & St. Louis, with headquarters at Fort Wayne, Ind., a newly created position, and **M. T. Dooling** has been appointed general agent at St. Louis, Mo., succeeding **E. E. Eversull**.

Frank M. Tuttle, division freight agent of the Central of Georgia, with headquarters at Macon, Ga., has been transferred in the same capacity to Atlanta, Ga., succeeding **Frank E. Ellis**,

who has been appointed assistant division freight agent at Atlanta. After 32 years of service in the freight traffic department, **Mr. Ellis**, owing to continued ill health, has found it necessary to be relieved of his duties as division freight agent at Atlanta, which position he has filled since February 14, 1917. **H. C. White**, Florida freight and passenger agent at Jacksonville, Fla., has been appointed division freight agent at Macon, Ga., succeeding **Mr. Tuttle**.

E. T. Reynolds, assistant freight traffic manager on the Pere Marquette, with headquarters at Detroit, Mich., has been promoted to freight traffic manager in charge of solicitation, with the same headquarters. **R. P. Paterson**, freight traffic manager, with headquarters at Detroit, will continue in that position with supervision principally over rates and tariffs as before. **F. W. Goldie**, assistant freight traffic manager, with headquarters at Chicago, has been appointed assistant freight traffic manager, solicitation, at Detroit, succeeding **Mr. Reynolds**, and **J. C. Harms**, general freight agent, with headquarters at Detroit, has been promoted to assistant freight traffic manager, solicitation, with headquarters at Chicago, replacing **Mr. Goldie**. **E. L. Thrall**, assistant general freight agent at Detroit, has been advanced to general freight agent at that point, relieving **Mr. Harms**, and **W. P. Lee**, chief clerk in the freight traffic department at Detroit, has been promoted to assistant general freight agent at that point succeeding **Mr. Thrall**.

ENGINEERING AND SIGNALING

R. S. Gutelius, acting division engineer of the Susquehanna division of the Delaware & Hudson, with headquarters at Oneonta, N. Y., has been appointed division engineer of that division.

Roy A. Brown, roadmaster on the Chicago, Rock Island & Pacific, with headquarters at Manly, Iowa, has been appointed acting division engineer of the Western division, with headquarters at Fairbury, Neb., relieving **E. F. Manson**, who has taken a leave of absence because of illness.

W. H. Kyle has been appointed division engineer, Montreal Terminals, Canadian National, with headquarters at Montreal, Que., succeeding **W. H. B. Bevan**, who has been transferred in the same capacity to the Ottawa division, with headquarters at Ottawa, Ont., to succeed **H. J. Black**, deceased. **M. P. Blake** has been appointed bridge and building master, Montreal Terminals, succeeding **A. C. Oxley**, transferred.

MECHANICAL

R. E. Detrick, roundhouse foreman on the Chicago, Rock Island & Pacific at El Reno, Okla., has been promoted to master mechanic, with headquarters at Dalhart, Tex., relieving **C. F. McWilliams**, who has been assigned to other duties.

C. S. Young, road foreman of engines on the Missouri Pacific, with headquarters

at North Little Rock, Ark., has been promoted to general road foreman of engines, with headquarters at St. Louis, Mo., relieving **E. R. Lockhart**, who retired on March 1.

SPECIAL

Paul W. Van Camp has been appointed publicity representative of the Central region of the Pennsylvania, with headquarters at Pittsburgh, Pa.

Dr. Judson L. Taylor has been appointed chief surgeon of the Southern Pacific Lines in Texas and Louisiana and chief surgeon of the hospital association, with headquarters at Houston, Tex., succeeding **Dr. Charles C. Green**, who has resigned.

The New York Central has established a public relations department under the direction of **C. R. Dugan**, who has been appointed manager, public relations, with headquarters at New York. The jurisdiction of this department will include supervision of the publicity bureau.

OBITUARY

Marvin C. Bailey, general agent on the Texas & Pacific, at Oklahoma City, Okla., died on February 24.

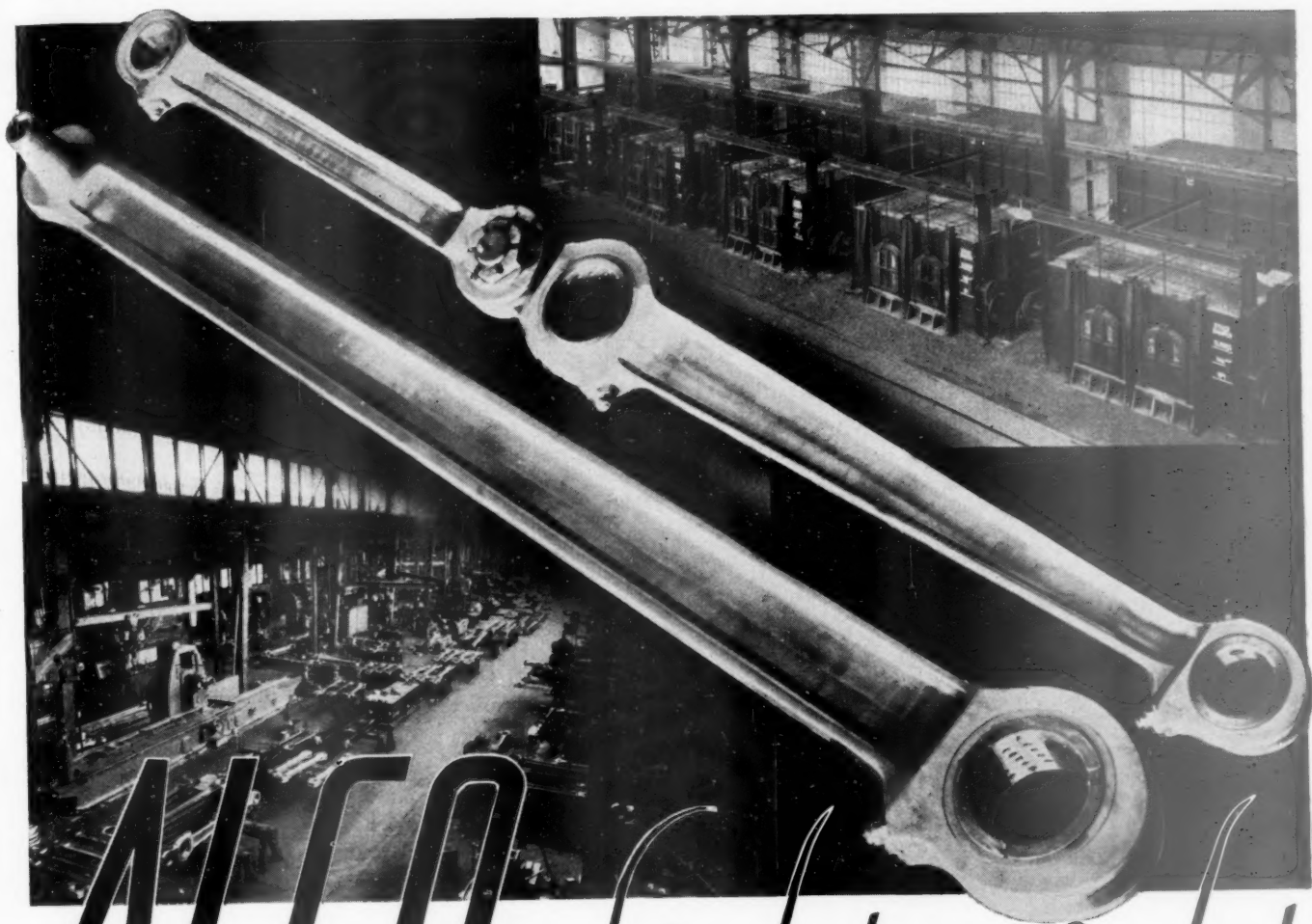
Sir Joseph W. Flavelle, who was chairman of the board of the Grand Trunk (Canadian National) during 1921, with headquarters at Toronto, Ont., died at Palm Beach, Fla., on March 7, after a heart attack. He was 81 years old.

William N. Neff, who was at one time federal manager of the St. Louis Southwestern and the Louisiana & Arkansas and who retired on February 1, 1938, as general superintendent of the Western division of the Northwestern Pacific (Southern Pacific system) with headquarters at Sau-



William N. Neff

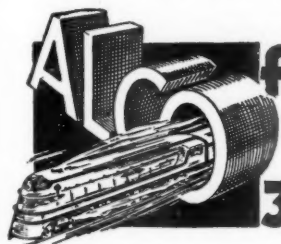
salito, Cal., died on February 27, at the Southern Pacific hospital in San Francisco, Cal., after a long illness. **Mr. Neff** was born on April 11, 1874, at Lawrence, Kan., and at the age of 15 years became a warehouseman on the Missouri Pacific. In September, 1895, he went with the Great Northern as a telegraph operator and in



ALCO *Lightweight* FORGINGS

LIGHT-WEIGHT alloy steel forgings for modern locomotives demand far more than correct engineering design. Engineering ability of the highest calibre must be available, of course, but, unless manufacturing facilities are thoroughly modern, and unless smith shop personnel is specially competent and experienced in this particular class of work—is it possible to compete with ALCO either as to forging quality or price?

ALCO has spared no expense equipping its forging department with ultra-modern, smith shop machinery and with the very latest heat-treating facilities for the scientific production of light-weight, locomotive forgings. Also, ALCO metallurgists, engineers and smith shop experts have had wide experience in locomotive forging manufacture over an extended period of years. Having the added advantage of ALCO's unsurpassed facilities, these men are prepared *in every respect* to meet your locomotive forging requirements with the utmost satisfaction as to quality and price.



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1899 was promoted to assistant superintendent at Kalispell, Mont. In 1900, Mr. Neff went with the St. Louis Southwestern as superintendent at Pine Bluff, Ark., later becoming successively general superintendent, and vice-president and general superintendent of the St. Louis Southwestern of Texas. During the period from 1914 to 1917, he served as superintendent of the Northwestern Pacific at San Francisco, and then returned to the Cotton Belt as Vice-president and general manager, with headquarters at Tyler, Tex. During the period of federal control of the railroads, Mr. Neff was federal manager of the Cotton Belt and the Louisiana and Arkansas. In April, 1920, he was appointed chairman of the Southwestern Railway Executives Association at St. Louis. His work with this group was completed in July, 1922, and after a period of two years in which he engaged in other occupations, he was appointed superintendent of the Pueblo division of the Denver & Rio Grande Western, with headquarters at Pueblo, Colo. On March 28, 1928, he was appointed general

superintendent of the Northwestern Pacific, with headquarters at Sausalito, Cal.

John Francis Sheahan, former mechanical engineer of the Atlanta, Birmingham & Coast, died in Atlanta, Ga., on February 22. Mr. Sheahan was born on November 21, 1863, at Glyn, Limerick County, Ireland, and attended Franklin Institute, Philadelphia, Pa., and Mechanics Institute, Rochester, N. Y. He entered railroad service in 1880 as apprentice and machinist on the Pennsylvania and then served successively in the mechanical departments of the Camden & Atlantic (P. R. R.); Buffalo, Rochester & Pittsburgh (Baltimore & Ohio); Orange Belt (now Atlantic Coast Line); Plant system (A. C. L.); Southern; International-Great Northern; and the Georgia & Florida. From 1912 to 1922 Mr. Sheahan was superintendent motive power of the Atlanta, Birmingham & Atlantic (now Atlanta, Birmingham & Coast), and in 1923 he was appointed mechanical engineer of the latter road, retiring in 1933.

Louis H. Barker, who retired on March 1, 1921, as resident engineer of the Pennsylvania, with headquarters at New York, died on February 20 at his home in Croton-On-Hudson, N. Y., at the age of 87. Mr. Barker was born at New Brighton, Pa., on September 6, 1851, and entered the service of the Pennsylvania on August 10, 1876, as assistant supervisor, Baltimore division. He subsequently served as assistant engineer, engineer maintenance of way and principal assistant engineer in the maintenance of way department until January 1, 1905, when he was appointed assistant chief engineer. When the construction of the tunnels under the Hudson and East rivers was undertaken for the extension of the Pennsylvania into New York, Mr. Barker was transferred to this project as resident engineer of Sunnyside Yard, Long Island. Upon completion of the Pennsylvania railroad extension in New York, Mr. Barker was appointed resident engineer, with headquarters at New York, where he remained until his retirement.

Net Income for Twelve Months of Calendar Year 1938

		Net Income				Net Income	
		1938	1937			1938	1937
Akron, Canton & Youngstown	12 mos.	\$79,890	\$89,466	Louisiana & Arkansas	12 mos.	\$521,836	\$409,825
Alton	12 mos.	1,447,567	1,010,514	Louisiana, Arkansas & Texas	12 mos.	70,523	19,356
Atchison, Topeka & Santa Fe System	12 mos.	8,228,044	7,659,404	Louisville & Nashville	12 mos.	2,706,016	7,100,346
Atlanta & West Point	12 mos.	84,286	58,957	Maine Central	12 mos.	302,623	473,547
Western Ry. of Alabama	12 mos.	54,748	51,151	Midland Valley	12 mos.	19,915	124,111
Atlanta, Birmingham & Coast	12 mos.	173,799	87,635	Minneapolis & St. Louis	12 mos.	2,243,576	2,418,069
Atlantic Coast Line	12 mos.	1,858,450	2,454,141	Minneapolis, St. Paul & S. S. Marie	12 mos.	6,638,310	5,735,097
Charleston & Western Carolina	12 mos.	13,711	215,421	Duluth, South Shore & Atlantic	12 mos.	1,077,417	462,942
Baltimore & Ohio	12 mos.	13,124,530	720,695	Spokane International	12 mos.	206,221	154,594
Staten Island Rapid Transit	12 mos.			Mississippi Central	12 mos.	90,190	94,985
Bangor & Aroostook	12 mos.	238,969	845,224	Missouri & Arkansas	12 mos.	6,400	21,135
Bessemer & Lake Erie	12 mos.	815,190	6,361,588	Missouri-Illinois	12 mos.	32,385	59,012
Boston & Maine	12 mos.	5,099,626	202,220	Missouri-Kansas-Texas Lines	12 mos.	3,849,166	1,625,477
Burlington, Rock Island	12 mos.	837,931	866,876	Missouri-Pacific	12 mos.	14,767,960	8,778,894
Cambria & Indiana	12 mos.	778,757	844,043	Gulf Coast Lines	12 mos.		
Canadian Pacific Lines in Maine	12 mos.			International Great Northern	12 mos.	3,380,763	2,579,407
Canadian Pacific Lines in Vermont	12 mos.			Mobile & Ohio	12 mos.	558,346	647,439
Central of Georgia	12 mos.	2,991,867	2,372,810	Monongahela	12 mos.	303,665	568,173
Central of New Jersey	12 mos.	4,264,825	2,082,386	Montour	12 mos.	574,637	947,923
Central Vermont	12 mos.	1,763,283	1,141,908	Nashville, Chatt. & St. Louis	12 mos.	142,295	471,623
Chesapeake & Ohio	12 mos.	20,682,833	34,562,446	Nevada Northern	12 mos.	173,687	268,792
Chicago & Eastern Illinois	12 mos.	1,387,650	715,842	New York Central	12 mos.	20,154,357	6,352,512
Chicago & Illinois Midland	12 mos.	224,434	529,908	Pittsburgh & Lake Erie	12 mos.	1,698,521	4,039,530
Chicago & North Western	12 mos.	15,275,983	14,811,098	New York, Chicago & St. Louis	12 mos.	1,059,504	2,655,561
Chicago, Burlington & Quincy	12 mos.	3,641,763	4,907,254	New York, New Haven & Hartford	12 mos.	11,623,193	7,713,451
Chicago Great Western	12 mos.	1,144,273	902,363	New York Connecting	12 mos.	2,251	165,799
Chicago, Indianapolis & Louisville	12 mos.	1,851,020	1,549,681	New York, Ontario & Western	12 mos.	1,994,314	1,675,286
Chicago, Mil., St. Paul & Pacific	12 mos.	17,996,270	14,221,271	Norfolk & Western	12 mos.	20,538,842	32,053,214
Chicago, Rock Island & Pacific	12 mos.	11,516,769	10,054,466	Norfolk Southern	12 mos.	489,408	323,541
Chicago, Rock Island & Gulf	12 mos.	1,085,562	713,122	Northern Pacific	12 mos.	4,322,416	117,740
Chicago, St. Paul Minn. & Omaha	12 mos.	2,674,368	2,612,094	Northwestern Pacific	12 mos.	2,395,455	1,664,098
Clinchfield R. R.	12 mos.			Oklahoma City, Ada-Atoka	12 mos.	1,687	49,281
Colorado & Southern	12 mos.	453,366	251,552	Pennsylvania	12 mos.	11,046,100	27,278,638
Fort Worth & Denver City	12 mos.	120,509	748,161	Long Island	12 mos.	2,209,678	2,115,812
Columbus & Greenville	12 mos.	129,662	9,896	Pennsylvania - Reading Seashore	12 mos.		
Delaware & Hudson	12 mos.	156,205	998,165	Lines	12 mos.	3,030,456	2,651,350
Delaware, Lackawanna & Western	12 mos.	3,954,954	936,772	Pere Marquette	12 mos.	2,259,803	1,669,858
Denver & Rio Grande Western	12 mos.	5,660,107	5,945,944	Pittsburgh & Shawmut	12 mos.	74,392	56,430
Denver & Salt Lake	12 mos.	846	8,691	Pittsburgh & West Virginia	12 mos.	200,213	638,541
Detroit & Mackinac	12 mos.	39,754	14,250	Pittsburgh, Shawmut & Northern	12 mos.	77,106	129,785
Detroit & Toledo Shore Line	12 mos.	256,716	970,963	Reading	12 mos.	3,295,309	6,839,345
Detroit, Toledo & Ironton	12 mos.	379,692	1,573,035	Richmond, Fredericksburg & Potomac	12 mos.	515,310	980,273
Duluth, Missabe & Iron Range	12 mos.	457,263	11,455,742	Rutland	12 mos.	891,797	408,608
Duluth, Winnipeg & Pacific	12 mos.	10,941	7,635	St. Louis-San Francisco	12 mos.	11,474,772	7,756,656
Elgin, Joliet & Eastern	12 mos.	272,132	1,498,921	St. Louis, San Francisco & Texas	12 mos.	213,865	323,983
Erie	12 mos.	10,777,794	433,293	St. Louis Southwestern Lines	12 mos.	926,877	944,163
New Jersey & New York	12 mos.	323,789	394,523	Seaboard Air Line	12 mos.	7,590,161	4,630,279
New York, Susquehanna & Western	12 mos.	545,771	434,283	Southern Railway	12 mos.	497,772	805,992
Florida East Coast	12 mos.	1,965,526	2,181,193	Alabama Great Southern	12 mos.	1,496,179	1,820,665
Georgia Railroad	12 mos.	106,456	128,256	Cinn., New Orleans & Texas Pacific	12 mos.	2,213,791	3,262,589
Georgia & Florida	12 mos.	717,097	628,079	Georgia, Southern & Florida	12 mos.	266,652	53,381
Grand Trunk Western	12 mos.	4,901,453	863,852	New Orleans & Northeastern	12 mos.	46,044	229,781
Canadian Natl. Lines in New Eng.	12 mos.	6,403	15,354	Northern Alabama	12 mos.	73,088	34,448
Great Northern	12 mos.	2,712,560	10,089,920	Southern Pacific Transportation	12 mos.	6,829,008	756,793
Green Bay & Western	12 mos.	172,539	173,111	Spokane, Portland & Seattle	12 mos.	2,804,045	1,862,673
Gulf & Ship Island	12 mos.	348,170	110,681	Tennessee Central	12 mos.	44,691	120,011
Gulf, Mobile & Northern	12 mos.	115,588	345,118	Texas and Pacific	12 mos.	1,421,856	2,440,627
Illinois Central	12 mos.	1,114,096	1,960,316	Texas Mexican	12 mos.	473,259	198,758
Yazoo & Mississippi Valley	12 mos.	529,642	496,717	Toledo, Peoria & Western	12 mos.	236,901	252,556
Illinois Central System	12 mos.	1,114,096	1,960,316	Union Pacific System	12 mos.	18,701,234	17,655,516
Illinois Terminal	12 mos.	88,885	44,079	Utah	12 mos.	103,553	81,489
Kansas City Southern	12 mos.	347,274	842,128	Virginia	12 mos.	5,572,536	7,058,734
Kansas, Oklahoma & Gulf	12 mos.	488,271	637,792	Wabash	12 mos.	6,127,890	3,051,791
Lake Superior & Ishpeming	12 mos.	77,127	1,386,666	Ann Arbor	12 mos.	324,403	151,142
Lehigh & Hudson River	12 mos.	155,777	243,498	Western Maryland	12 mos.	455,461	1,803,137
Lehigh & New England	12 mos.	337,798	382,944	Western Pacific	12 mos.	4,450,489	3,450,965
Lehigh Valley	12 mos.	3,280,613	898,553	Wheeling and Lake Erie	12 mos.	1,693,928	3,735,467

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY OF CALENDAR YEAR 1939

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Net railway operating income	
		Freight	Passenger	Total (inc. misc.)	Maintenance of way and structures	Traffic	Trans- portation			1939	1938
Akron, Canton & Youngstown.....Jan.	171	\$180,519	\$41	\$187,786	\$21,953	\$13,398	\$54,301	62.1	\$71,234	\$39,600	—\$14,518
Alton.....Jan.	959	777,192	1,179,824	1,956,996	154,232	43,298	530,023	81.9	213,039	50,299	—22,451
Atchafalaya, Topeka & Santa Fe System.....Jan.	13,475	8,935,734	1,355,192	11,309,763	1,412,888	456,159	4,627,490	86.3	1,546,611	143,218	—866,641
Atlanta & West Point.....Jan.	93	105,889	24,071	150,987	14,756	7,652	70,423	86.2	20,881	—2,742	—24,355
Western of Alabama.....Jan.	133	98,537	23,978	141,695	17,135	7,488	56,401	76.1	19,762	6,036	—2,623
Atlanta, Birmingham & Coast.....Jan.	639	276,864	34,935	334,758	46,435	23,861	121,933	88.9	70,459	22,491	—34,918
Atlantic Coast Line.....Jan.	5,108	3,100,917	766,945	4,340,761	445,768	178,061	1,708,971	76.4	1,022,913	572,913	337,274
Charleston & Western Carolina.....Jan.	5,443	195,142	746	200,298	25,554	329,633	68,000	66.5	42,108	30,385	7,081
Baltimore & Ohio.....Jan.	6,405	10,364,661	850,062	11,953,480	890,185	7,517	4,608,647	75.7	2,901,442	1,670,919	296,901
Staten Island Rapid Transit.....Jan.	24	52,516	137,474	137,474	13,763	1,013	87,366	96.9	4,250	—24,512	—33,165
Bangor & Aroostook.....Jan.	603	540,992	16,156	575,198	89,551	5,449	144,986	60.1	229,285	171,635	167,564
Bessemer & Lake Erie.....Jan.	224	407,159	699	419,974	40,004	14,567	141,669	112.8	—53,779	—96,721	—215,945
Boston & Maine.....Jan.	1,959	2,726,564	581,268	3,826,135	374,001	58,167	1,580,455	72.2	1,062,505	754,478	478,721
Burlington, Rock Island.....Jan.	255	76,029	17,433	100,700	14,383	4,373	47,448	93.1	6,920	—1,492	—17,955
Cambria & Indiana.....Jan.	37	145,588	.....	145,588	5,145	430	13,436	45.75	79,028	40,267	116,026
Canadian Pacific Lines in Maine.....Jan.	234	215,112	15,159	244,277	18,906	8,479	87,656	67.0	80,453	69,715	42,990
Central of Georgia.....Jan.	1,871	1,003,104	116,929	1,270,669	26,534	52,224	59,431	132.1	—26,943	—33,664	—33,727
Central Vermont.....Jan.	712	2,044,907	348,740	2,565,142	484,331	44,865	1,128,234	77.2	583,858	228,118	47,560
Chesapeake & Ohio.....Jan.	430	333,979	407,222	741,201	48,818	11,197	204,662	92.2	31,668	5,224	—32,385
Chicago & Eastern Illinois.....Jan.	3,110	8,631,797	239,439	9,136,438	947,508	205,083	2,290,496	62.7	3,404,917	2,383,568	2,429,471
Chicago & Illinois Midland.....Jan.	8,383	4,624,058	888,028	6,208,259	780,313	190,826	2,845,439	89.9	629,176	11,310	—214,747
Chicago & North Western.....Jan.	927	934,064	145,645	1,231,186	139,313	54,125	510,554	79.4	253,937	174,937	43,184
Chicago, Burlington & Quincy.....Jan.	1,941	5,772,961	726,216	7,255,688	640,758	232,580	2,797,966	74.7	1,833,382	1,116,143	752,484
Chicago, Great Western.....Jan.	1,505	1,300,443	42,666	1,446,160	133,374	39,571	568,183	77.5	325,173	235,979	33,840
Chicago, Indianapolis & Louisville.....Jan.	549	588,070	49,775	702,691	81,028	30,754	311,196	92.0	56,141	10,438	—89,973
Chicago, Milwaukee, St. Paul & Pacific.....Jan.	10,941	6,728,141	646,691	8,096,095	960,952	207,251	3,361,412	80.7	1,561,168	842,168	437,013
Chicago, Rock Island & Gulf.....Jan.	7,342	4,589,440	650,183	5,705,973	607,236	231,826	2,397,047	83.4	949,327	467,976	154,414
Chicago, St. Paul, Minneapolis & Omaha.....Jan.	1,629	1,072,752	112,943	1,266,693	109,157	39,552	684,259	91.1	112,977	568	—95,454
Cincinnati, Hamilton & Dayton.....Jan.	308	608,944	3,038	617,462	30,438	15,237	116,280	45.0	339,408	289,452	313,054
Colorado & Southern.....Jan.	804	343,340	30,089	428,610	40,782	13,642	200,663	91.4	36,689	—40,883	—59,546
Fort Worth & Denver City.....Jan.	902	401,895	49,104	443,179	50,734	19,093	174,759	83.1	74,742	37,790	9,745
Columbus & Greenville.....Jan.	168	98,328	110,080	208,408	18,150	4,241	41,197	81.3	20,549	9,870	6,129
Delaware & Hudson.....Jan.	831	1,908,954	106,984	2,096,784	170,774	39,420	766,436	67.0	692,731	545,891	528,908
Delaware, Lackawanna & Western.....Jan.	986	3,092,301	569,664	4,088,512	180,788	110,535	1,932,203	76.2	971,354	571,354	491,526
Denver & Rio Grande Western.....Jan.	2,563	1,665,417	185,806	2,121,451	489,280	71,925	686,509	78.7	394,542	200,695	145,021
Denver & Salt Lake.....Jan.	232	200,959	6,511	216,451	15,736	2,516	63,847	63.6	78,717	49,069	82,284
Detroit & Mackinac.....Jan.	242	41,710	3,342	55,070	7,185	837	23,336	85.8	7,791	4,672	629
Detroit & Toledo Shore Line.....Jan.	50	366,189	.....	366,189	19,867	8,999	114,913	47.2	193,799	154,281	95,147
Detroit, Toledo & Ironton.....Jan.	472	696,767	176	722,383	86,985	11,982	140,693	42.9	412,204	325,519	297,342
Duluth, Missabe & Iron Range.....Jan.	540	64,194	1,225	84,087	118,925	4,673	144,599	62.4	—440,837	—554,928	—514,496
Duluth, Winnipeg & Pacific.....Jan.	175	114,536	1,349	118,888	20,947	2,186	50,419	77.8	26,347	17,271	5,960
Elgin, Joliet & Eastern.....Jan.	390	1,329,029	1	1,480,356	131,416	15,478	525,090	64.5	524,887	387,888	322,331

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Dawn to Dawn.

**ECONOMICAL
OPERATION
EVERY MINUTE**



GM

**DIESEL
POWER**

EMC high availability and low operating costs are the direct results of high standards of construction—correct principles of design throughout—superior materials—advanced manufacturing methods—expert workmanship—scientific inspections—all combined to produce the most efficient locomotives money and science can build.

ELECTRO-MOTIVE C
SUBSIDIARY OF GENERAL MOTORS L



MAXIMUM REVENUE-EARNING SERVICE HOURS

24 HOURS of continuous service without costly "time-outs" for taking water, fueling, cleaning fires, boiler washing, is the reason why EMC Diesel Switchers deliver the greatest number of revenue-producing service hours per dollar of investment. In over one million hours of economical operation all EMC Diesel Switchers have averaged over 94 per cent availability—and on some roads as high as 98 per cent.

And that means big economies — big reductions in operating costs — because switching requirements are being taken care of with fewer units and in less locomotive hours. On one road 37 EMC Diesels have already replaced 80 steam switchers—and each EMC Switcher is saving \$1,000.00 per month after all charges. Where maximum Diesel availability is utilized, EMC Diesels produce savings sufficient to liquidate their investment in the short period of five years.

EMC CORPORATION
LA GRANGE, ILLINOIS, U. S. A.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY OF CALENDAR YEAR 1939—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Total	Operating ratio	Net railway operating income	
		Freight	Passenger	Total (inc. misc.)	Maintenance of way and structures	Equipment	Traffic			from operation	1939
Erie	2,290	\$5,477,399	\$391,700	\$6,274,752	\$490,855	\$1,323,190	\$167,605	\$4,732,101	75.4	\$1,542,651	\$745,105
New Jersey & New York	144	256,252	18,571	287,207	16,128	22,838	3,192	111,542	58.1	120,320	43,792
New York, Susquehanna & Western	685	656,856	324,551	1,090,067	91,576	149,155	26,470	357,371	63.6	397,312	313,689
Florida East Coast	329	254,323	11,284	288,477	22,102	50,128	18,683	124,780	79.6	58,873	43,434
Georgia Railroad	408	78,597	1,196	83,581	19,663	15,503	8,117	35,086	100.1	—110	—8,020
Georgia & Florida	1,032	1,579,981	83,404	1,802,321	219,425	380,573	39,497	790,794	83.4	298,619	172,851
Grand Trunk Western	172	94,908	4,890	111,288	29,145	13,347	2,669	79,575	118.5	—20,608	—36,772
Canadian National Lines in New England	8,072	4,381,763	358,418	5,169,885	553,093	1,233,896	179,322	2,216,221	85.7	738,414	46,944
Great Northern	234	140,845	361	145,607	21,825	8,015	7,046	49,860	64.0	52,350	39,585
Green Bay & Western	259	75,953	3,432	88,827	18,635	25,662	2,551	44,375	108.9	—7,909	—24,698
Gulf & Ship Island	824	482,300	17,859	524,119	69,490	81,364	40,955	150,319	71.9	147,195	100,195
Gulf, Mobile & Northern	4,949	6,488,218	829,228	7,849,710	750,243	1,639,087	190,975	3,086,489	76.4	1,849,131	1,135,101
Illinois Central	1,619	969,359	56,890	1,105,640	120,004	178,406	30,369	484,962	77.5	248,512	110,229
Yazoo & Mississippi Valley	6,568	7,457,577	886,118	8,955,350	870,247	1,817,493	221,344	3,571,451	76.6	2,097,643	1,243,277
Illinois Central System	496	334,120	58,526	428,522	47,115	71,242	15,677	163,917	73.81	112,212	70,809
Illinois Terminal	879	951,877	14,661	1,071,911	89,140	150,024	52,216	310,652	61.7	410,558	311,558
Kansas City Southern	327	217,799	357	220,774	12,135	9,171	9,003	42,947	36.3	140,712	120,557
Kansas, Oklahoma & Gulf	156	22,640	72	23,562	16,959	19,699	639	41,318	275.8	—41,432	—77,989
Lake Superior & Ishpeming	96	137,288	87	137,953	9,496	23,430	3,977	45,909	64.8	32,275	21,348
Lehigh & Hudson River	200	281,609	.....	283,719	23,954	57,479	6,656	102,555	72.8	77,254	55,985
Lehigh & New England	1,285	3,458,283	168,778	3,854,070	187,348	619,160	109,886	1,628,575	69.8	1,165,717	865,217
Lehigh Valley	606	463,868	7,456	490,033	70,791	68,141	31,017	135,311	66.7	162,975	118,312
Louisiana & Arkansas	240	421,166	3	97,411	20,779	11,886	4,621	35,007	78.9	20,537	15,382
Louisiana, Arkansas & Texas	4,925	6,379,870	559,015	7,464,607	731,164	1,623,564	194,427	2,575,912	72.4	2,063,596	1,329,531
Louisville & Nashville	1,004	908,312	69,431	1,080,384	148,522	177,935	11,526	397,809	71.2	311,106	243,161
Maine Central	352	106,031	2	107,862	9,001	7,391	2,765	28,557	50.5	53,395	42,479
Midland Valley	1,524	623,283	8,773	666,203	67,626	116,171	48,023	272,625	81.3	124,515	80,940
Minneapolis & St. Louis	4,290	1,543,987	75,529	1,754,865	243,123	385,616	60,107	907,863	95.9	71,884	—126,459
Minneapolis, St. Paul & Sault Ste. Marie	550	111,761	11,298	135,774	25,059	29,236	5,292	75,175	103.7	—5,015	—18,655
Duluth, South Shore & Atlantic	152	57,666	1,145	65,474	6,962	5,554	2,212	25,135	67.9	21,000	16,207
Spokane International	150	59,135	1,328	62,772	21,920	8,408	7,013	20,548	89.4	6,850	2,143
Mississippi Central	365	73,110	1,517	87,197	21,246	10,833	5,516	30,117	84.6	13,404	9,536
Missouri & Arkansas	193	155,191	381	157,115	16,589	17,168	2,531	47,368	56.8	67,853	60,590
Missouri Illinois	3,264	1,807,856	185,053	2,076,037	221,037	317,500	40,156	903,130	84.4	346,416	189,487
Missouri-Kansas-Texas Lines	7,173	5,590,181	403,777	6,547,651	707,556	1,297,305	237,738	2,555,956	77.2	1,494,029	1,002,993
Missouri Pacific	1,759	1,382,729	39,273	1,493,121	188,396	178,566	50,142	417,867	59.13	610,194	537,633
Gulf Coast Lines	1,155	790,786	69,975	962,298	149,154	198,155	33,552	425,725	89.4	102,154	388,423
International Great Northern	1,180	854,127	24,564	920,930	148,964	197,492	43,130	353,968	85.3	135,256	—206
Mobile & Ohio	172	332,909	636	335,393	29,948	29,923	542	79,228	42.5	192,687	165,451
Monongahela	56	123,662	.....	126,053	8,163	38,159	37,256	90,410	72.2	35,074	45,975
Montour	1,111	1,008,715	120,915	1,262,007	139,383	211,123	68,201	469,120	73.9	334,873	235,291
Nashville, Chattanooga & St. Louis	165	52,048	456	56,910	5,862	3,885	1,264	10,469	47.1	30,115	21,005
Nevada Northern	11,043	19,389,564	5,249,555	27,503,163	2,676,989	5,859,544	508,787	10,666,600	76.5	6,466,333	2,147,005
New York Central	233	1,180,100	47,729	1,274,209	102,228	473,056	29,829	1,176,111	92.3	98,098	175,330
Pittsburgh & Lake Erie	165	52,048	456	56,910	5,862	3,885	1,264	10,469	47.1	30,115	21,005
Nevada Northern	11,043	19,389,564	5,249,555	27,503,163	2,676,989	5,859,544	508,787	10,666,600	76.5	6,466,333	2,147,005
Pittsburgh & Lake Erie	233	1,180,100	47,729	1,274,209	102,228	473,056	29,829	1,176,111	92.3	98,098	175,330

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY OF CALENDAR YEAR 1939—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Net railway operating income			
		Freight	Passenger	Total (inc. misc.)	Maintenance of Way and structures	Equip-ment	Traffic			Trans-portion	Total	Operating income	1939	1938
New York, Chicago & St. Louis.....Jan.	1,704	\$3,156,134	\$72,307	\$3,330,002	\$336,352	\$502,037	\$118,558	\$1,240,826	69.5	\$1,014,588	\$808,775	\$538,757	\$117,438
New York, New Haven & Hartford.....Jan.	1,884	3,626,735	2,178,635	6,478,585	654,960	1,074,655	97,367	2,597,687	73.8	1,696,971	1,181,971	554,274	-173,663
New York Connecting.....Jan.	21	241,613	.....	249,289	11,407	14,056	.....	29,827	22.7	192,702	150,782	160,805	27,011
New York, Ontario & Western.....Jan.	576	528,295	5,546	586,551	51,246	125,148	14,435	287,413	86.2	80,929	26,832	-11,226	-45,921
Norfolk & Western.....Jan.	2,191	6,826,842	160,871	7,203,249	683,202	1,508,632	136,933	1,718,933	58.9	2,957,235	1,914,515	2,100,934	760,008
Norfolk Southern.....Jan.	805	292,333	2,520	310,044	68,482	55,633	23,797	130,604	97.4	8,012	-25,599	-35,015	-58,835
Northern Pacific.....Jan.	6,721	3,489,867	296,544	4,189,735	372,622	1,015,235	155,397	1,841,018	87.7	514,330	-22,108	271,210	-301,375
Northwestern Pacific.....Jan.	352	137,741	46,649	208,581	50,361	46,494	2,855	143,084	121.7	-45,325	-63,190	-71,059	-131,403
Oklahoma City-Ada-Tulsa.....Jan.	132	28,113	207	30,359	6,666	1,116	842	11,302	72.0	8,509	5,602	1,390	1,323
Pennsylvania.....Jan.	10,289	23,815,921	6,318,921	32,896,733	3,257,531	7,144,487	646,117	12,334,459	74.9	8,253,264	5,532,984	4,998,796	2,241,760
Long Island.....Jan.	383	526,790	1,212,494	1,825,775	199,475	347,194	6,070	970,461	85.5	265,015	73,566	-104,925	-63,211
Pennsylvania-Reading Seashore Lines.....Jan.	412	229,641	92,154	339,512	70,506	74,893	5,825	260,272	125.7	-87,221	-160,617	-217,584	-253,436
Pere Marquette.....Jan.	2,115	2,198,879	91,757	2,393,175	299,993	493,135	60,020	949,104	79.3	495,872	341,968	178,828	-212,403
Pittsburgh & Shawmont.....Jan.	101	52,859	.....	53,269	5,959	19,817	1,404	17,519	91.08	4,753	2,889	210	-1,112
Pittsburgh & West Virginia.....Jan.	136	251,022	.....	268,120	29,239	56,180	16,056	63,784	70.6	78,782	55,195	66,210	48,910
Pittsburg, Shawmont & Northern.....Jan.	190	98,869	.....	99,768	9,939	12,556	950	31,837	60.9	38,971	33,869	24,115	-1,169
Reading.....Jan.	1,450	4,159,710	313,049	4,662,986	364,962	821,466	70,825	1,880,461	70.5	1,374,973	996,837	959,724	635,311
Richmond, Fredericksburg & Potomac.....Jan.	118	368,263	279,308	753,253	50,300	132,378	10,045	316,985	74.1	195,150	135,818	74,781	33,094
Rutland.....Jan.	407	181,019	31,980	260,434	27,836	57,498	10,158	152,106	99.3	1,834	-22,294	-23,940	-88,273
St. Louis-San Francisco.....Jan.	4,843	2,818,108	288,024	3,415,928	585,808	883,104	116,174	1,388,598	92.4	260,158	-63,836	-65,147	-283,628
St. Louis, San Francisco & Texas.....Jan.	267	108,089	503	124,976	23,958	15,347	8,006	51,752	84.8	18,989	10,694	-19,450	-43,947
St. Louis Southwestern Lines.....Jan.	1,701	1,432,268	24,916	1,517,374	203,563	301,975	82,965	533,020	78.8	321,266	213,165	74,545	33,128
Seaboard Air Line.....Jan.	4,317	2,930,125	754,065	4,044,208	512,817	775,823	190,607	1,470,728	78.4	873,525	523,525	361,013	101,511
Southern Railway.....Jan.	6,598	6,583,448	708,545	7,944,636	974,581	1,301,915	159,946	2,848,596	70.4	2,348,293	1,663,422	1,362,284	278,423
Alabama Great Southern.....Jan.	315	512,631	41,603	593,312	80,565	126,698	13,383	197,231	74.2	152,980	79,400	94,925	28,253
Cincinnati, New Orleans & Texas Pacific.....Jan.	337	1,271,585	126,288	1,486,907	167,209	269,579	26,366	377,347	60.2	592,063	422,512	429,201	231,350
Georgia Southern & Florida.....Jan.	398	142,444	66,606	231,276	33,666	36,203	1,759	92,019	74.4	59,137	42,684	35,407	21,530
New Orleans & Northeastern.....Jan.	204	196,524	13,898	228,088	32,793	37,350	6,132	65,446	67.2	74,905	43,843	23,266	-25,514
Northern Alabama.....Jan.	100	53,969	929	56,605	12,402	1,219	923	17,048	59.4	23,005	17,261	8,301	-3,720
Southern Pacific.....Jan.	8,657	9,183,571	1,505,308	11,733,805	1,327,927	2,277,931	311,938	4,748,844	80.5	2,289,053	1,103,781	608,768	-419,631
Southern Pacific Steamship Lines.....Jan.	4,416	496,038	18,859	546,734	12,264	104,839	16,764	372,258	96.0	21,658	7,469	7,359	-81,583
Texas & New Orleans.....Jan.	948	2,943,980	261,546	3,483,975	499,647	560,791	122,456	1,236,471	75.6	852,294	548,036	319,723	38,580
Spokane, Portland & Seattle.....Jan.	287	558,075	29,980	642,100	97,380	85,269	10,659	243,537	72.6	176,058	103,331	59,179	49,584
Tennessee Central.....Jan.	287	190,560	4,333	206,578	28,688	30,170	6,201	75,564	73.1	55,550	42,459	24,806	17,793
Texas & Pacific.....Jan.	1,936	1,726,363	194,665	2,095,446	218,557	379,621	72,226	708,501	71.6	595,313	444,983	336,371	258,577
Texas Mexican.....Jan.	162	51,572	290	62,641	10,762	13,323	3,023	31,387	102.6	-1,607	-7,493	-10,486	-10,836
Toledo, Peoria & Western.....Jan.	239	149,622	58	151,804	20,001	15,975	16,304	38,853	67.0	50,069	34,894	22,052	29,811
Union Pacific System.....Jan.	9,904	9,646,329	1,253,342	11,914,096	835,026	2,353,453	383,668	8,646,891	72.6	3,267,205	1,992,036	1,344,023	768,282
Utah.....Jan.	111	83,119	.....	83,245	11,289	27,288	390	22,641	78.8	17,690	5,086	7,148	-4,978
Virginian.....Jan.	638	1,872,040	2,697	1,917,091	132,172	374,595	23,963	286,275	45.3	1,048,225	778,225	809,402	661,054
Wabash.....Jan.	2,410	3,087,770	220,919	3,580,133	384,032	627,900	148,552	1,475,045	7.78	753,167	534,280	174,968	-229,137
Ann Arbor.....Jan.	294	315,148	3,095	324,721	25,559	64,014	13,349	141,961	79.1	67,912	47,806	32,644	-22,178
Western Maryland.....Jan.	878	1,350,697	6,398	1,401,569	160,778	330,868	39,879	371,829	67.9	450,593	375,593	391,835	255,560
Western Pacific.....Jan.	1,208	1,095,672	22,065	1,134,659	129,145	218,846	56,130	445,419	81.1	214,862	128,881	28,981	-249,963
Wheeling & Lake Erie.....Jan.	508	1,077,843	11	1,113,607	95,278	228,615	36,602	351,757	66.7	370,998	231,267	296,695	38,301

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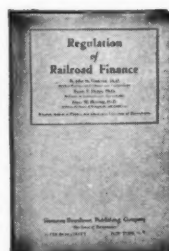
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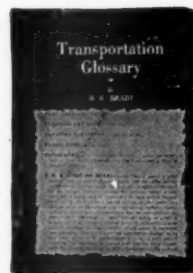
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